UNITED NATIONS

EP

United Nations Environment Programme

Distr.
GENERAL

UNEP/OzL.Pro/ExCom/46/29
6 June 2005

ORIGINAL: ENGLISH

EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Forty-sixth Meeting
Montreal, 4-8 July 2005

PROJECT PROPOSALS: CHINA

This document consists of the comments and recommendations of the Fund Secretariat on the following project proposals:

Fumigant

- National phase-out of methyl bromide (second phase) — Italy

Process agent

- Phase out the production and consumption of CTC for process agent and other non-identified uses (phase I): 2005 annual programme — World Bank

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS
CHINA

PROJECT TITLE	BILATERAL/IMPLEMENTING AGENCY
National phase-out of methyl bromide (second phase)	UNIDO (Lead agency), Italy (Co-operating agency)

NATIONAL CO-ORDINATING AGENCY:	SEPA

LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT

A: ARTICLE-7 DATA (ODP tonnes, 2003, as of October 2004)

Annex E, methyl bromide	1,008.00		

B: COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes, 2003, as of October 2004)

ODS	Foam	Ref.	Aerosol	ODS	Solvents	Process agent	Fumigant
				Methyl bromide			1,008.0

CFC consumption remaining eligible for funding (ODP tonnes)	n/a

CURRENT YEAR BUSINESS PLAN: Total funding US $0: total phase-out 0 ODP tonnes.

PROJECT DATA	2003	2004	**2005**	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Montreal Protocol limits	1,102.1	1,102.1	**881.7**	881.7	881.7	881.7	881.7	881.7	881.7	881.7	881.7	881.7	0	
Annual consumption limit	1,087.8	1,087.8	**880.0**	723.8	570.6	390.0	250.0	209.0	176.0	150.0	100.0	50.0	0	
Annual phase-out from ongoing projects														
Annual phase-out newly addressed UNIDO	0	0	**207.8**	156.2	65.2	124.6	0	0	0	0	0	0	0	553.8
Annual phase-out newly addressed Italy	0	0	**0**	0	88.0	56.0	140.0	41.0	33.0	26.0	50.0	50.0	50.0	534.0
Total ODS consumption to be phased out	0	0	**207.8**	156.2	153.2	180.6	140.0	41.0	33.0	26.0	50.0	50.0	0	1,087.8
Total ODS consumption to be phased-in (HCFCs)														n/a
Project cost as originally submitted (US $)	4,086,600	0	**4,000,000**		1,200,000	1,800,000	1,300,000	600,000	500,000	500,000	500,000	302,742		17,873,391
Final Project costs (US $):														
Funding for UNIDO	4,086,600	0	**0**	0	1,200,000	1,800,000	1,300,000	600,000	500,000	500,000	500,000	302,742	0	11,194,747
Funding for Italy	0	0	**4,000,000**	0	0	0	0	0	0	0	0	0	0	3,594,595
Total project funding	4,086,600	0	**4,000,000**	0	1,200,000	1,800,000	1,300,000	600,000	500,000	500,000	500,000	302,742	0	14,789,342
Final Support costs (US $)														
Support cost for UNIDO	306,495	0	**0**	0	90,000	135,000	97,500	45,000	37,500	37,500	37,500	22,706	0	839,606
Support cost for Italy	0	0	**470,000**	0	0	0	0	0	0	0	0	0	0	405,405
Total support costs	306,495	0	**470,000**	0	90,000	135,000	97,500	45,000	37,500	37,500	37,500	22,706	0	1,245,012
Total cost to Multilateral Fund (US $)	4,393,095*	0	**4,470,000**	0	1,290,000	1,935,000	1,397,500	645,000	537,500	537,500	537,500	325,448	0	16,034,354
Final project cost effectiveness (US $/kg)														13.61

* Funding approved at the 41st Meeting of the Executive Committee

SECRETARIAT'S RECOMMENDATION	Blanket approval at the costs indicated for 2005

PROJECT DESCRIPTION

1. The Government of China has submitted for consideration by the Executive Committee at its 46th Meeting, the progress report on the implementation of the first phase of the national methyl bromide (MB) phase-out plan approved at the 41st Meeting, and the request for funding of the second tranche of the project at a cost of US $4,000,000 plus US $470,000 in agency support costs for the Government of Italy.

Background

2. China is both a producer and a consumer of MB. The MB baselines for production and consumption are 776.3 ODP tonnes and 1,101.6 ODP tonnes, respectively.

3. The Government of China submitted a national MB phase-out plan for consideration by the Executive Committee at its 41st Meeting, requesting assistance to reduce its MB consumption by 389.0 ODP tonnes. Subsequently, the Executive Committee approved US $4,086,600 (excluding support costs) for UNIDO for the phase-out of 389.2 ODP tonnes of MB in the consumption sector, on the understanding that the Government of China would have flexibility in utilizing the resources available for the phase-out of MB in any crop or application it deemed more appropriate. The Executive Committee also requested UNIDO to assist the Government of China to work towards the completion of a project proposal for the phase-out of all controlled uses of MB for submission to the Executive Committee.

4. At its 44th Meeting, the Executive Committee considered a national plan for the phase-out of MB in the consumption sector in China submitted by UNIDO, on behalf of the Government of China. The project was to phase out 1,087.8 ODP tonnes of MB at a total cost to the Fund of US $17,873,391 (including the US $4,086,600 that was approved at the 41st Meeting). The project was to be implemented by UNIDO (as the lead implementing agency) and the Government of Italy (as the cooperating bilateral implementing agency).

5. During the discussion on the project the Executive Committee was informed that, after consultations with major stakeholders in China, UNIDO had redesigned some project components resulting in a reduction in project costs of about US $3 million. An additional US $5.4 million would be provided by the Government of China as a counterpart contribution. The Executive Committee was also made aware that the contribution of the Government of Italy would be paid in one tranche in 2005.

6. Subsequently, the Executive Committee approved in principle the national plan for the phase-out of MB in the consumption sector in China at a total level of funding of US $14,789,342 (including the US $4,086,600 previously approved at the 41st Meeting), and it also approved an Agreement between the Government of China and the Executive Committee.

Progress report

7. As agreed with the Government of China, the first phase of the project focuses on the phase-out of MB used in the tobacco and commodities sectors. The alternative technologies selected were the floating tray system for the tobacco sector and phosphine fumigation for the

commodities sector. The activities associated with this phase of the project will be completed at the end of 2006.

8. Preparation for the phase-out of MB in the tobacco sector commenced in July 2004. The following activities have been implemented:

(a) SEPA and the State Tobacco Monopoly Administration (STMA) established a Special Working Group for the Tobacco Consumption Subsector, and agreed on its institutional structure, duties and functions. The Working Group became operational in November 2004.

(b) STMA carried out surveys on the consumption of MB in the subsector and performed cost analysis of alternative technologies based on the updated information;

(c) A training programme for 10 members of the Working Group was conducted in Brazil in November 2004;

(d) The terms of reference for the training course have been drafted and the operational procedure has been discussed. A total of 160 technicians and staff from tobacco companies and 715 farmers will participate in the training course;

(e) The specifications for the greenhouses and micro-tunnels have been drafted and a detailed implementation plan has been rediscussed following completion of a survey of several provinces where MB is used. The procurement of equipment and farm material is scheduled for August 2005 because the seedling season started in March and MB fumigation has been completed.

9. So far, 200 ODP tonnes of MB has been phased out by tobacco companies with their own funding and the support of the STMA.

10. Preparation for the phase-out of MB in the commodities sector also commenced in July 2004. The following activities were implemented:

(a) SEPA and the State Grain Administration (SGA) established a Special Working Group for the Commodities Consumption Subsector, and agreed on its institutional structure, duties and functions. The Working Group became operational in November 2004;

(b) A detailed implementation phase-out plan in the commodities sector was drafted. In August 2004, a workshop to select alternative technologies to the use of MB was conducted. As a result of discussions, phosphine and a combination of phosphine with CO_2 were selected as the most cost-effective alternative technology;

(c) A training programme for 10 members of the Working Group was conducted in Austria and Germany in December 2004;

(d) The Chengdu Research Institute of Grain Storage was selected as the institution to implement a detailed survey of the 116 warehouses in the country that use MB as a fumigant. The survey started in August 2004. By the end of March 2005, a total of 55 warehouses located in 9 provinces had been surveyed;

(e) Thirty-five warehouses have been selected as demonstration sites to receive financial support to purchase equipment for the use of the alternative technology. All other warehouses have been selected to receive technical training for phasing out MB;

(f) The training and technical assistance programme was awarded to SGA. Technicians from grain storage facilities where MB had been used, managers from 16 provinces, and representatives from the grain storage sector will participate in the training course (about 360 persons);

(g) The specifications for the equipment to be procured have been completed (See attachment 11).

11. So far, a total of 73.8 ODP tonnes of MB have been phased out in 20 warehouses.

12. The notice for management of the MB production quota was issued in July 2004; and the license for MB import/export (including QPS) has been effective since 1 January 2004.

13. So far, UNIDO has obligated US $4,082,342 (excluding agency support costs), of which US $2,857,100 has been disbursed. The next disbursement amounting to US $816,468 will take place upon approval of the second progress report due in May 2005.

Action plan

14. The second phase of the project will commence in July 2005; it will focus mainly on the phase-out of about 700 ODP tonnes of MB used as a soil fumigant in the horticulture, strawberry and flower sectors, and remaining consumption of MB in the tobacco sector. The programme for the second phase involves procurement of equipment and the implementation of a comprehensive training programme for a large number of extension staff and farmers.

15. The field activities will start in September 2005, with the following schedule:

(a) September-December 2005: procurement of the first set of equipment and set up training courses;

(b) January-February 2006: delivery and installation of first set of equipment and start implementation of the training programme;

(c) March–August 2006: application of MB alternatives on spring crops (March to June), and autumn crops (June to August);

(d) September 2006: monitoring and evaluation of the sites where alternatives to MB have been applied, and finalization of the 2007 implementation plan.

16. Based on the above schedule, it is proposed that, for the 2007 production season, MB alternatives will be applied on both spring and autumn crops. This schedule was developed on the basis of the project document and UNIDO's previous experience in phasing out MB in similar applications and crops in other Article 5 countries.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

17. The Secretariat noted that, since the approval of the first tranche of the project at the 41st Meeting, a total of 273.8 ODP tonnes of MB have been phased out in the tobacco sector (200 ODP tonnes) and the commodities sector (73.8 ODP tonnes). According to the agreement between the Government of China and the Executive Committee, the first reduction in MB consumption is proposed for the end of 2005 (i.e., 207.8 ODP tonnes).

18. The Secretariat and UNIDO discussed issues related to the implementation of the second tranche of the project, at a total cost of US $4 million representing over 27 per cent of the total project cost. UNIDO indicated that the second phase of the project will focus mainly on training activities and on the implementation of large-scale tests and trials of the several alternative technologies to be used for the various crops and applications. The training needs of the different subsectors phasing out MB are distinctly different:

(a) About 960,000 tobacco growers will be trained in the production of seedlings using the floating tray system. Implementing this activity involves training 32,000 trainees in all aspects of production (i.e., phytopathology aspects associated with the floating tray system, construction of micro-tunnels and greenhouse, water conductivity, pruning);

(b) About 57,500 growers of eggplant, cucumber, tomato, strawberry, flower, ginseng and hot pepper crops will be trained in the alternative technologies relevant to each crop;

(c) Training in commodities fumigation will be provided to relevant staff at 146 storage facilities located in almost all provinces of China. It is proposed that a minimum of 5 technicians in each storage facility be trained in the use of phosphine and in procedures to prevent insect resistance to this fumigant.

19. UNIDO also pointed out that, for the 2005-2007 period, the project will focus on the phase-out of MB used as soil fumigant in the production of strawberry, tomato, cucumber and tobacco crops and as a fumigant in commodities. During this period, the eggplant, hot pepper and flower crops will also be taken into account to ensure the smooth phase-out of MB in these crops in the 2008-2010 period.

RECOMMENDATION

20. The Fund Secretariat recommends blanket approval of the project with associated support costs at the funding level shown in the table below.

	Project Title	Project Funding (US $)	Support Costs (US $)	Implementing Agency
(a)	National phase-out of methyl bromide (second tranche)	4,000,000	470,000	Italy

SECTOR PLAN FOR THE PHASE-OUT OF CTC AND PROCESS AGENTS IN THE PEOPLE'S REPUBLIC OF CHINA (PHASE I):

Verification of the 2004 Annual Work Programme and 2005 Annual Programme

Introduction

21. At its 38th Meeting in November 2002, the Executive Committee approved, in principle US $65 million for the Agreement with the People's Republic of China to phase out the production and consumption of CTC, and the consumption of CFC-113 (phase I) and disbursed the first tranche of US $2 million at that meeting to start implementation. China has committed to complying with the Montreal Protocol phase-out schedule for CTC production and consumption by implementing the Agreement. Subsequently at its 39th Meeting in March 2003 and the 43rd Meeting in 2004 the Executive Committee approved the 2003 annual programme at a funding level of US $20 million and the 2004 annual programme at US $16 million respectively.

22. The World Bank submitted the 2005 annual programme to the 44th Meeting, with the understanding that the release of the funding for 2005 would happen only when the verification of the results of the implementation of the 2004 annual programme was available. Consequently the Executive Committee approved the 2005 annual programme at the 44th meeting but withheld the funds till the World Bank submitted the verification of the 2004 implementation results (decision 44/29).

23. The World Bank is submitting to this meeting the complete verification of the production and consumption of CTC and the consumption of CFC-113 for 2004 (attached), requesting the release of the 2005 tranche of US $2 million as well as the associated support cost of US $150,000.

24. For easy reference, phase out targets and the associated funding levels in the CTC Agreement are reproduced below.

		Baseline[1/]	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
		ODP tonnes										
1.	Max allowable sum of production and imports of CTC	86,280	64,152	64,152	61,514	54,857	38,686	32,044	26,457	23,583	17,592	11,990
2.	CTC feedstock	N/A	55,319	45,400	45,333	39,306	28,446	21,276	15,129	11,662	5,042	-
3.	Max Allowable CTC consumption for other PA applications [2/]	N/A	N/A	7,389	7,832	8,302	8,800	9,328	9,888	10,481	11,110	11,997
4.	Max allowable CTC consumption in the PA applications in Appendix 2	3,825	4,347	5,049	5,049	5,049	493	493	493	493	493	220
5.	Other non identified uses	N/A	N/A	6,314	3,300	2,200	947	947	947	947	947	-
6.	Max allowable CFC-113 consumption in the PA sector	17.2	17.2	17.2	17.2	14	14	10.8	8.4	0	0	0
7.	**MULTILATERAL FUND SUPPORT (in US$ thousands)**											**Total $**
8.	MLF Funding			2,000	20,000[3/]	16,000[3/]	2,000[3/]	16,000[3/]	5,000[3/]	3,000[3/]	1,000[3/]	65,000
9.	Agency support costs			150	1,500	1,200	150	1,200	375	225	75	4,875

[1/] Baseline includes average CTC consumption over 1998-2000.
[2/] Applications in Appendix IV.
[3/] Subject to consideration of the disbursement schedule at the 39th Meeting of the Executive Committee.

25. The verification of the production and consumption of CTC and the consumption of CFC-113 in 2004 consists of three parts: verification of the production of CTC, verification of consumption of CTC and CFC-113 in the process agent sector, and a summary of the verifications.

Verification of the CTC production in 2004

26. The production verification was carried out in March 2005 by the same team of three consultants who carried out the verification in 2004. It consisted of two technical experts and one financial analyst. The report included a technical audit part and a financial audit part.

27. The technical audit part contained the results of the visits and investigation of 12 out of the 16 CTC producers in China. The other 4 producers had closed down and were not visited. Table 1 provides a list of the 16 plants with the name of the plant, 2004 production quota allocated by SEPA, 2004 actual production verified, and status of the plant (closed or in production).

28. The verification collected from each of the plants the following information: plant identification; plant history, such as date of construction, number of CTC production lines, capacity, and baseline production for 2002 and 2001; plant production process; production quota for 2004 allocated by SEPA; daily production logs and transfer records; daily and monthly CTC inventory; and CTC packed for sales from daily transfer records of the product warehouse.

29. The verification team also checked the consumption of raw materials, chlorine, and organic raw materials like methane, methanol and ethylene from daily shift transfer records and the opening and closing stocks from monthly production inventory. In addition, the team also calculated the CTC output ratio and raw material consumption ratio and compared them with the

theoretical values in order to determine whether or not the values varied within a reasonable range.

30. Since the production of chloromethane products generate a series of other products in addition to CTC, the team also collected information on the production of the co-products methyl chloride, methylene chloride, chloroform and perchloroethylene in order to reach material balance between input and output.

31. At the same time, the financial analyst of the team reviewed the reliability of the accounting system, invoices of purchases and sales records. The results of the technical audit and the financial audits were then compared for consistency, and on that basis the team drew its conclusion whether the plant was in compliance with the quota allocated by SEPA.

32. The verification report provides details on the verification carried out at each plant. It includes the verification of: the CTC production, stocks and sales; supply and consumption of chlorine; supply and consumption of methane, methanol, and ethylene depending on the technology applied in the plant; a presentation of the results in tabular form of the production of CTC, co-produced chloromethane products, and the raw material consumption and the ratios. The verification of each plant concludes with an assessment of whether the plant has met its assigned production quota for 2004 after making a comparison of results from the technical and financial audits carried out in parallel. The report finally presents the findings using the format from the guidelines for verifying ODS production phase-out, which includes information on production level, raw material consumption and ratio, number of operating days, and monthly movement of raw material inventory.

33. In addition, the verification team also reported that 6,012.01 ODP tonnes of CTC were used as feedstock for the production of other non-ODS chemicals, although the team did not visit any of these plants. Table 2 includes a list of these non-ODS chemicals provided by SEPA with details of the applications, the purchase of CTC in 2004, and the CTC consumption in 2004.

34. Finally, the verification concludes that China produced in total 50,194.67 ODP tonnes of CTC in 2004 against the target of 54,857 ODP tonnes as established in the Agreement with the Executive Committee.

35. The Secretariat, in accordance with the established practice of submitting documents on production verification, is not including the data part. The data, however, can be made available to any member of the Executive Committee upon request.

Verification of the consumption of CTC and CFC-113 in process agent sector in 2004

36. The verification of the consumption of CTC and CFC-113 was carried out in March 2005 by a team of two, one technical expert and one financial analyst. The team visited 19 enterprises and Table 2 provides a list of the enterprises visited with information on the name of the plant, opening stock and closing stock, purchases and consumption of CTC or CFC-113. Since 10 out of the 19 enterprises were closed, Table 3 provided the list of the 10 closed plants, with details of name of the plants, contract number with SEPA for closure, the date of the contract signed, date of the plants being dismantled, and CTC phased out.

37. The verification included talking to plant management, checking the opening and closing stocks of CTC and CFC113 each month; purchase orders and transfer records; daily production logs and movement records from production lines to warehouse and sales; records on packaging and inventory; accounting records; contractual arrangement with SEPA for closure; and visiting the production lines and dismantled sites.

38. The report provides a summary on each of the enterprises visited, including a description of the enterprises, the verification carried out and the conclusions. The conclusions usually contain a presentation of the opening and closing stocks and procurement of CTC, with the final assessment of the consumption of CTC for the year. There is also an assessment of the actual production of the final product of the plant obtained by examining the production and movement of the inventory.

39. The verification concludes that the total consumption of CTC as process agents in 2004 was 3885.76 ODP tonnes, which was below the target of 5,049 ODP tonnes as established in the Agreement, and the total consumption of CFC-113 was 10.80 ODP tonnes and so below the target of 14 ODP tonnes set in the Agreement. The verification also identifies a number of other findings and two of them relate to the efforts of the Chinese Government to exercise control over CTC production, sales, and consumption.

Summary of the verification reports

40. The summary of the verification provides an overview of the production and consumption of CTC and the consumption of CFC-113 against the targets set in the Agreement approved at the 38th Meeting. It also provides an assessment of the verification results against the requirements of the Montreal Protocol on the relevant substances. It includes a section on the CTC production verification, a section on CTC use as a feedstock by CFC producers, a section on CTC consumption as a feedstock for non-ODS chemical production, a section on CTC use as a process agent for the applications covered by the sector plan (phase I), CTC import and export, and finally an overall assessment of the CTC production and CTC consumption in China for 2004 using the Montreal Protocol definitions of production and consumption. For easy reference, three of the summary tables are reproduced below, Tables 1, 6 and 7.

Table 1: CTC production and consumption in ODP tonnes

Year	CTC production* (Row 1 of the agreement)		Use of CTC for CFC feedstock consumption (Row 2 of the agreement		Use of CTC for the 25 PA applications (Row 4 of the agreement)		Use of CFC-113 for 25 PA applications (Row 5 of the agreement)	
	Allowed	Verified	Allowed	Verified	Allowed	Verified	Allowed	Verified
Base	86,280	N/A	N/A	N/A	3,825	N/A	17.2	N/A
2001	64,152	N/A	55,139	NA	4,347	N/A	17.2	N/A
2002	64,152	N/A	45,400	NA	5,049	N/A	17.2	N/A
2003	61,514	59,860	45,333	39,839	5,049	3,080	17.2	17.1
2004	**54,857**	**50,195**	**39,306**	**34,168**	**5,049**	**3,886**	**14**	**10.8**
2005	38,686		28,446		493		14	
2006	32,044		21,276		493		10.8	
2007	26,457		15,129		493		8.4	
2008	23,583		11,662		493		0	
2009	17,592		5,042		493		0	
2010	11,990		0		220		0	

Table 6: National CTC production

CTC Production	**(ODP tonnes)**
Gross CTC production	56,206.68
Used as feedstock for non-ODS applications	-6,012.01
CTC production as per the agreement	**50194.67**
Used as feedstock for CFC production	-34,167.90
Destroyed by technologies approved by the Parties	0
National CTC production as per the Montreal Protocol	**16026.77**

* Until reviewed and included in the list of process agent applications approved by the Parties, the uses are considered feedstock applications.

Table 7: National CTC consumption

CTC Consumption	**(ODP tonnes)**	**MP Baseline**
Production as per the Montreal Protocol	16026.77	29,367.4
Import of CTC	0	
Export of CTC	0	
National CTC consumption as per the Montreal Protocol	16026.77	55,903.8

Comments of the Secretariat

Verification of the 2004 production and consumption of CTC and the consumption of CFC-113

41. The verification was carried out in accordance with the verification framework which the World Bank developed for carrying out verifications of CTC phase out sector plans for China and India and which was noted by the Executive Committee. The summary of the verification is

particularly useful in providing an overview of the entire verification, which included an assessment of both CTC production and consumption, and CFC-113 consumption against the targets set in the Agreement, and also an assessment of potential to comply with the Montreal Protocol.

42. The results of the verification confirm that China met the targets of the Agreement with the Executive Committee for the year 2004 for the CTC production and consumption as process agents (Phase I) and for CFC-113 consumption. This is shown in the Table 1 above, which was reproduced from the World Bank submission.

43. It is noted that SEPA reported 6,012.01 ODP tonnes of CTC which were used in the production of non-ODS chemicals as feedstock, and this amount was deducted from the total CTC production. This is consistent with decision 44/29 of the Executive Committee which further clarifies that the Agreement should not include any CTC production for use as feedstock for non-ODS chemicals. However the decision also requires that China should verify such uses and report on them to the Ozone Secretariat under Article 7 of the Montreal Protocol.

44. There were several instances where the CTC production verification team identified discrepancies between the results from the technical audit and the examination of the financial records and sought clarifications from the plants but did not receive a response. The auditors later clarified to the Secretariat that these were minor differences and did not prevent them from reaching their conclusions.

45. Following the practice of submitting similar verification reports of the production sector, the Secretariat is not submitting the data part of the verification, but would make this available to members of the Executive Committee upon request.

Recommendations

46. The Secretariat recommends that the Executive Committee may wish to:

(a) Take note of the verification report of the production and consumption of CTC and the consumption of the CFC-113 of China for the year 2004; and

(b) Release funding for the 2005 annual programme at the proposed amount of US $2 million plus the support cost of US $150,000 for the World Bank, in light of the fact that the verification confirmed that China has met the targets of the Agreement with the Executive Committee for the year 2004.

2004 SUMMARY VERIFICATION REPORT

FOR

THE PROCESS AGENT SECTOR PLAN: PHASE 1

WORLD BANK

WASHINGTON, D.C., USA

MAY 2005

1. Introduction

As required by the agreement between China and the Executive Committee of the Multilateral Fund for Phase 1 of the Process Agent Sector Plan, China's annual production and consumption of CTC and consumption of CFC-113 must be verified independently by the World Bank. This report provides a summary of the verification of the 2003 production/consumption of these ozone depleting substances, including consumption in the 25 process agent applications covered by the agreement.

Consistent with the requirements, the World Bank appointed independent verification teams for the CTC production verification and for the verification of consumption of the process agent companies covered by the agreement. Each of the two teams consisted of two technical experts and one financial expert. The guidelines for CFC production verification were used as a template for the verification of CTC production, but adjusted to reflect the special features of different CTC production technologies. The consumption verification followed the general format for verifying consumption by ODS consuming companies. The CTC production verification report and the CTC and CFC-113 process agent consumption verification report are submitted separately.

2. Conclusion

The two verification teams were able to verify that the overall production of CTC and consumption of CTC and CFC-113 were within the limits set by the agreement between China and the ExCom. Details appear in Table 1 below.

Table 1: CTC production and consumption in ODP tonnes

Year	CTC production* (Row 1 of the agreement)		Use of CTC for CFC feedstock consumption (Row 2 of the agreement		Use of CTC for the 25 PA applications (Row 4 of the agreement)		Use of CFC-113 for 25 PA applications (Row 5 of the agreement)	
	Allowed	Verified	Allowed	Verified	Allowed	Verified	Allowed	Verified
Base	86,280	N/A	N/A	N/A	3,825	N/A	17.2	N/A
2001	64,152	N/A	55,139	NA	4,347	N/A	17.2	N/A
2002	64,152	N/A	45,400	NA	5,049	N/A	17.2	N/A
2003	61,514	59,860	45,333	39,839	5,049	3,080	17.2	17.1
2004	**54,857**	**50,195**	**39,306**	**34,168**	**5,049**	**3,886**	**14**	**10.8**
2005	38,686		28,446		493		14	
2006	32,044		21,276		493		10.8	
2007	26,457		15,129		493		8.4	
2008	23,583		11,662		493		0	
2009	17,592		5,042		493		0	
2010	11,990		0		220		0	

3. CTC production verification

The verification team audited each of the 10 CTC producers presently producing CTC in China and the two CTC distillers. CTC production in 2004 was confirmed as 50,194.67 ODP tonnes.

The detailed production and raw material figures are reported in the annexes to the CTC production verification report.

Table 2: Summary of quotas issued by SEPA and actual verified CTC production in 2004

Name of producer		**2004 CTC Production Quota (MT)**	**2004 CTC Production (MT)**	**Comments**
CTC 1	Luzhou North Chemical Co. , Ltd.	2,106.00	2,093.80	
CTC 2	Zhejiang Juhua Fluoro-chemical Co., Ltd.	14,904.00	15,986.01	A new CH_3OH-based CMs line put into production in 2004.
CTC 3	Lioning Panjing No. 3 Chemical Plant	0	0	Plant Closed.
CTC 4	Chongqing Tianxuan Chemical Co., Ltd.	0	0	Plant Closed Dec. 26, 2003
CTC 6	Chongqing Tianyuan Chemical General Plant	1,465.00	1,429.27	Plant Closed April 16, 2004.
CTC 7	Taiyuan Chemical Industrial Co., Ltd.	0	0	Plant closed
CTC 8	Luzhou Xinfu Chemical Industry Co., Ltd.	4,494.00	4,488.60	
CTC 9	Jiangsu Meilan Chemical Co., Ltd.	3,453.00	3.450.46	A new CH_3OH-based CMs line put into production in 2004
CTC 10	Guangzhou Hoton Chemical (Group) Co., Ltd.	0	0	Plant closed
CTC 11	Sichuan Honghe Fine Chemical Co., Ltd.	11,941.00	11,935.78	A new CH_3OH-based CMs line put into production in 2004
CTC 12	Shanghai Chlor-Alkali	7,909.00	7,909.00	
CTC 14	Wuxi Greenapple	1,140.00	1,139.28	
CTC 15	Shandong Jinling	800.00	1,721.34	
CTC 16	Shandong Dongyue Fluo-Silicon Material Co., Ltd.	300.00	309.80	New CMs plant built in 2004
CTC 5	Chongqing Tiansheng	177.00	31.14	CTC Residue Distillation
CTC 13	Quzhou Jiuzhou	596.00	602.50	CTC Residue Distillation
Gross 2004 CTC Production in China		**49,285.00 MT**	**51,096.98 MT**	
2004 CTC Production for non-ODS chemicals			**5,465.47 MT**	As reported by SEPA
Verified 2004 CTC Production as per agreement (in MT)			**45,631.51 MT**	CTC production – non-ODS feedstock consumption
Verified 2004 CTC Production as per agreement (in ODP tons)			**50,194.67 ODP tons**	
Agreement Limit on 2004 CTC Production in China (in ODP tons)			**54,857.00 ODP tons**	

4. CTC used by CFC producers

The CTC used by the CFC producers was verified as part of the CFC verification. The report was submitted to the 42nd meeting of the ExCom for consideration. The total use of CTC as feedstock for CFC-11 and CFC-12 was 34,081.26 ODP tons. In addition, 86.64 ODP tons, (78.76 MT of CTC), were used for the production of CFC-12 used as raw material for the production of CFC-13. Hence the total CTC amount used for CFC production is 34,167.90 ODP tons.

Table 3: 2004 CTC consumption by CFC producers (all figures in ODS)

	CFC-11 production	CFC-12 production	CTC for CFC-11	CTC for CFC-12 (ODP tonnes)
Jiangsu Meilan Chemical Co., Ltd.	642.56	1,238.72	808.76	1,685.99
Zhejiang Juhua Fluorochemical Co., Ltd.	3,325.08	6,232.75	4,072.83	8,667.19
Zhejiang Dongyang Chemical Plant	0	1,213.07	0	1,701.70
Jiangsu Changsu* 3F Refrigerant Co. LTD	6,682.35	4,639.38	7,947.71	6,098.78
Total in MT	10,649.98	13,323.92	12,829.30	18,153.66
Total in ODP tonnes	10,649.98	13,323.92	14,112.23	19,969.03

5. Companies using CTC for non-ODS production

China has a number of non-ODS feedstock users. In order to allow monitoring of the total CTC production as defined by the MP, including CTC production for CTC for feedstock applications the use of CTC for feedstock is included in this summary report. The total consumption of CTC for feedstock is found by SEPA as 6,012.01 ODP tons. This amount includes some newly identified CTC feedstock applications (or PA applications not yet identified and listed by the Parties). Consistent with the provisions of the Montreal Protocol, the CTC production total are therefore reduced by 6012.01 ODP tons for non-ODS feedstock applications.

More feedstock applications and companies might be identified and confirmed through the work presently undertaken by SEPA for the implementation of Phase 1 of the Process Agent Sector Plan and the preparation of the PA sector plan, Phase 2. As the list of companies and their production is commercially sensitive, the list is not included here but is available to the Secretariat for internal review if so requested.

6. CTC used as process agent for the applications covered by Phase 1

A total of 27 production lines at 25 companies were verified. The verification included CTC procurement records and was checked against the quantities of the products produced by the companies and the historical ratio from the PA sector plan on CTC consumption per tonnes of the product produced.

Table 4: Companies using CTC as process agent

Enterprises using CTC as process agent	CTC 2004 opening stock (MT)	CTC Purchase (MT)	PA Use of CTC (MT)	CTC 2004 closing stock (MT)
Shanghai Dihe Chemical Plant	27.44	236.77	160.69	103.52
Haotian Chemical Co., Ltd. (CR2)	89.63	240.00	265.33	64.30
Wuxi Greenapple Chem Co Ltd (CR3)	28.27	-18.08	10.19	0
Zheijiang Xin'an Chemical and Industrial Co., Ltd. (CR4)	37.41	338.25	230.64	145.02
Jiangyin Fasten Fine Chemical Co. Ltd. (CR5)	38.70	760.50	213.75	585.45
Fujian Wantaixing Chem. Dev Company Ltd.	22.00	388.00	328.61	81.39
Huanghu Jinhua Chemical Co. Ltd.	17.25	12.00	29.25	0
Shenyang Chemical Co. Ltd. (CP4)	29.69	1.25	8.49	*22.45
Longchang Shenghua Chemical Plant	6.51	15.01	19.22	2.30
Chongqing Tiansheng Chemical Co. Ltd.	0	0	0	0
Dalian Jiangxi Chem-Industrial Co. Ltd. (CP9)	13.45	197.16	205.03	5.58
Jilin Chemical Industrial Co. Ltd. (CSR1).	546.59	1,343.57	1,649.73	**237.18
Huahai Pharmaceutical Co., Ltd. (KET1)	0	0	0	0
Jiangsu Anbang Group Corporation (ES1)	0	0	0	0
Jiangsu Liyang Guanghua Chemical Co. Ltd.	0	0	0	0
Total CTC Consumption	856.94	**3,532.51**	**3,120.93**	1,247.19 (See note * and ** below)
* Additional 22.45 MT of CTC used for other purposes, some sold to licensed CTC users and some lost.				
** Additional 3.25 MT of CTC used by the company for other purposes.				

Table 5. Companies using CFC-113 as process agent

CFC-113 uses for process agent applications (in MT)	Opening stock	Purchase	Used as PA	Closing stock
Shanghai 3F New Material Co. Ltd.	0.00	7.00	7.00	0.00
Chenguang Chemical Research Instituite	1.61	0.00	0.49	1.12
Jinan 3F Fluoro-Chemical Co. Ltd.	0.5	4.00	4.50	0.00
Fuxin Fluoro-Chemical Co. Ltd.	1.00	2.50	1.50	2.00
Total in MT	3,11	13.50	13.49	3.12
Total in ODP tons	2.49	**10.80**	**10.79**	2.50

7. CTC import and export

China did not import or export any CTC in 2004.

8. National production and consumption

Based on the verification carried out and information provided by SEPA, national CTC consumption and production are shown in the table below.

Table 6: National CTC production

CTC Production	(ODP tonnes)
Gross CTC production	56,206.68
Used as feedstock for non-ODS applications	-6,012.01
CTC production as per the agreement	**50194.67**
Used as feedstock for CFC production	-34,167.90
Destroyed by technologies approved by the Parties	0
National CTC production as per the Montreal Protocol	**16026.77**

* Until reviewed and included in the list of process agent applications approved by the Parties, the uses are considered feedstock applications.

Table 7: National CTC consumption

CTC Consumption	(ODP tonnes)	MP Baseline
Production as per the Montreal Protocol	16026.77	29,367.4
Import of CTC	0	
Export of CTC	0	
National CTC consumption as per the Montreal Protocol	16026.77	55,903.8

** See baseline below

Table 8:. Montreal Protocol Requirements and National Production and consumption.

	Production	Consumption
Montreal Protocol Baseline	29,367.4	55,903.8
Montreal Protocol limit in 2005 (85% reduction)	4,405.11	8,385.57
Actual CTC production and consumption in 2004	16026.77	16026.77

CHINA PROCESS AGENT SECTOR PLAN

PHASE I

2004 CTC Production Verification Report

The World Bank

March 2005

I. Summary

The CTC Verification Team verified, using the World Bank's Terms of Reference (TOR) as guidance, the production of each of the ten CTC producers and two CTC residue distillers presently producing in China. It was confirmed by the verification and included in the summary report that the 2004 CTC production in China was **50,194.67 ODP tonnes CTC** which was below the ExCom/China agreed amount of **54,857 ODP tonnes CTC** and below **SEPA's quota of 54,213.50 ODP tonnes**. The summary of each plant's verified production and assigned quota is found in Table 1 below. The detailed production, raw material, and financial figures are included in the ANNEXES to the summary report.

In conclusion, the verification team confirmed that each producer with two exceptions had produced within the production quotas assigned to them by SEPA. Both companies (CTC 13 and CTC 16) had not included the last six days and the last three days, respectively, of their CTC production in December production report due to their accounting practices.

Table1: Summary of quotas issued by SEPA and actual verified CTC production in 2004

Name of producer		**2004 CTC Production Quota (MT)**	**2004 CTC Production (MT)**	**Comments**
CTC 1	Luzhou North Chemical Co. , Ltd.	2,106.00	2,093.80	
CTC 2	Zhejiang Juhua Fluoro-chemical Co., Ltd.	14,904.00	15,986.01	A new CH_3OH-based CMs line put into production in 2004. 1,099.89 MT sold to non-ODS feedstock consumers
CTC 3	Lioning Panjing No. 3 Chemical Plant	0	0	Plant Closed.
CTC 4	Chongqing Tianxuan Chemical Co., Ltd.	0	0	Plant Closed Dec. 26, 2003
CTC 6	Chongqing Tianyuan Chemical General Plant	1,465.00	1,429.27	Plant Closed April 16, 2004.
CTC 7	Tianyuan Chemical Industrial Co., Ltd.	0	0	Plant closed
CTC 8	Luzhou Xinfu Chemical Industry Co., Ltd.	4,494.00	4,488.60	
CTC 9	Jiangsu Meilan Chemical Co., Ltd.	3,453.00	3.450.46	A new CH_3OH-based CMs line put into production in 2004
CTC 10	Guangzhou Hoton Chemical (Group) Co., Ltd.	0	0	Plant closed
CTC 11	Sichuan Honghe Fine Chemical Co., Ltd.	11,941.00	11,935.78	A new CH_3OH-based CMs line put into production in 2004
CTC 12	Shanghai Chlor-Alkali	7,909.00	7,909.00	
CTC 14	Wuxi Greenapple	1,140.00	1,139.28	
CTC 15	Shandong Jinling	800.00	1,721.34	1,044.98 MT sold to non-ODS feedstock consumers.
CTC 16	Shandong Dongyue Fluo-Silicon Material Co., Ltd.	300.00	309.80	New CMs plant built in 2004
	CTC Total Production	**48,512.00**	**50,463.34**	
CTC 5	Chongqing Tiansheng	177.00	31.14	CTC Residue Distillation
CTC 13	Quzhou Jiuzhou	596.00	602.50	CTC Residue Distillation
CTC MT Total by Distillation		**773.00**	**633.64**	
2004 CTC Production in China		**49,285.00 MT**	**51,096.98 MT**	
		54,213.50 ODP tonnes	**56,206.68 ODP tonnes**	
2004 CTC Production for non-ODS chemicals			**5,465.47 MT**	Reported by SEPA, see Table 2
Verified 2004 CTC Production in China			**45,631.51 MT 50,194.67 ODP tonnes**	2004 CTC production – SEPA reported 2004 non-ODS feedstock consumption
Agreement Limit on 2004 CTC Production in China			**49,870.00 MT 54,857.00 ODP tonnes**	

II. Companies using CTC for non-ODS production

SEPA reported that China currently has non-ODS CTC feedstock users consuming **5,465.47** MT CTC in 2004. This amount of non-ODS feedstock consumption including some newly identified CTC feedstock applications or PA applications not yet identified and listed by the Parties has been deducted from the overall CTC production verification total (see Table 1). The CTC Verification Team did not visit any company using CTC as a feedstock for non-ODS chemical production during its 2004 verification. Detailed information confirmed by SEPA is listed in Table 2 below.

Table 2: Use of CTC as feedstock for non-ODS production in 2004 in MT

Non-ODS feedstock applications	CTC purchase in 2004, MT	CTC consumption in 2004, MT	Reported by
1. DV methyl ester (2 enterprises)	1392.16	1408.18	SEPA
2. Chlorotriphenymethane	0.00	0.00	SEPA
3. Tetrachloride dimethylmethane	30.00	30.00	SEPA
4. 2-methyl-3-(trifluoromethyl)aniline	0.00	0.00	SEPA
5. HFC-236fa	471.01	470.01	SEPA
6. HFC-245fa	99.83	99.83	SEPA
7. HFC-365mfc	0.00	0.00	SEPA
8. 4-TFMOA	0.00	0.00	SEPA
9. TFMO	0.00	0.00	SEPA
10. DFTFB	0.00	0.00	SEPA
11. Flunarizine Hydrochloride	2.20	1.73	SEPA
12. Benzophenone	298.08	268.40	SEPA
13. Cinnamic acid	139.79	141.36	SEPA
14. 4,4-difluorodiphenyl ketone	29.35	29.35	SEPA
15. 3,3,3-trifluoropropene	490.54	484.14	SEPA
16. 4-trifluoromethoxybenzenamine (2 enterprises)	356.25	320.25	SEPA
17. Triphenylmethyl chloride (2 enterprises)	209.10	207.11	SEPA
18. 3,4-Difluoro-1-trifluorotoluene	0.00	0.00	SEPA
19. 1,2-Benzisothiazol-3-Ketone	43.00	43.00	SEPA
20. Other non-ODS feedstock applications	1904.16	1904.16	SEPA
Total, MT	**5,465.47**	**5407.51**	

CHINA CTC PRODUCTION PHASE-OUT PROGRAM
2004 VERIFICATION REPORT
March 10, 2005

CTC Verification Team

- E. John Wilkinson, Team Leader
- Zhiqun Zhang, Technical Consultant
- Wu Ning, Financial Analyst

Assisted and Accompanying by

- Wang, Xiaocheng, China State Environmental Protection Administration (SEPA), attended 2/18/05 - 2/23/05
- Gong, Xing Ming, SEPA, attended 2/24/05 – 3/05/05

Verification Mission Time Frame

The mission began on February 17, 2005 in Beijing and ended in Shandong on March 05, 2005. In total 12 enterprises were visited and verified.

Number	Enterprise	Process	Date
CTC 01	Luzhou North Chemical Industrial Co., Ltd.	Methanol- Based	Feb. 27, 2005
CTC 02	Zhejiang Juhua Fluorochemical Co., Ltd.	Methanol- Based	Feb. 18, 2005
CTC 03	Liaoning Panjin No.3 Chemical Plant	Closed in 2001	Not visited
CTC 04	Chongqing Tianxuan Chemical Co., Ltd.	Closed in 2003	Not Visited
CTC 05	Chongqing Tiansheng Chemical Co., Ltd.	Residue Distillation	Feb. 26, 2005
CTC 06	Chongqing Tianyuan Chemical General Plant	Methane-Based	Feb. 24, 2005
CTC 07	Tianyuan Chemical Industrial Co., Ltd	Closed in 1998	Not visited
CTC 08	Luzhou Xinfu Chemical Industry Co., Ltd.	Methane-Based	Feb. 28, 2005
CTC 09	Jiangsu Meilan Chemical Co., Ltd.	Methanol- Based	Feb. 22, 2005
CTC 10	Guangzhou Hoton Chemical Co., Ltd.	Closed in 1997	Not visited
CTC 11	Sichuan Honghe	Methane & Methanol-Based	Mar. 01, 2005
CTC 12	Shanghai Chlor-Alkali Chemical Co,	Ethylene-Based	Feb.20, 2005
CTC 13	Quzhou Jiuzhou Chemical Co., Ltd.	Residue Distillation	Feb. 19, 2005
CTC 14	Wuxi Greenapple Chemical Co., Ltd.	Methanol-Based	Feb. 21, 2005
CTC 15	Shandong Jinling Group Company	Methanol-Based	Mar. 03, 2005
CTC 16	Shandong Dongyue Fluorine & Silicon Material Co., Ltd.	Methanol-Based	Mar. 04-05, 2005

VERIFICATION METHODOLOGY USED FOR EACH PLANT VISITED

The Verification Team attempted to gather the following information from each plant in order to verify their 2004 CTC production:

- plant identification (name, technical audit number, address, contact person and function title, telephone and fax numbers, and email address);
- plant history (date of construction, number of CTC production lines, capacity in baseline year 2000, and baseline production for 2001 and 2002);
- plant process clarification and where within the plant process would it be best to collect CTC production data for our verification;
- CTC production quotas received from SEPA for 2004;
- daily CTC production logs and CTC product transfer records;
- daily and monthly CTC storage inventory; and
- CTC packaged for sales verified from daily movement records of CTC out of the product warehouse.

Secondary information was also gathered in order to support the CTC production data:

- chlorine (Cl_2) consumption from daily shift transfer records and opening and closing stocks from monthly production inventory;
- organic raw material methane (CH_4), methanol (CH_3OH) and ethylene (C_2H_4) supply from transfer records;
- organics consumption from opening and closing stocks inventory and daily shift transfer records;
- CTC's co-product's [methyl chloride (CM1), methylene chloride (CM2), chloroform (CM3), and perchloroethylene (PCE)] production in metric tones;
- CTC output ratios and raw material consumption ratios were calculated for CTC/ CMs, CTC/ (PCE+CTC), Cl_2/CTC, CH_4/CTC, CH_3OH/CTC, and C_2H_4/CTC. The Enterprise's annual average ratio was compared with the theoretical value in order to determine whether or not the values varied within a reasonable range and generally slightly above the theoretical value.

Concurrently, a financial verification was determined by reviewing and checking:

- the accounting system's reliability;
- the reports related to raw material purchase, storage and transfer;
- the accounting records of CTC production, transfer and sales;
- the track number from the accounting records traced back to the original documents; and
- all inconsistencies were asked to be clarified.

Once all of the above was completed, the CTC Verification Team would determine whether or not the Enterprise's 2004 CTC production data were verified. If there were any irresolvable data differences between the financial analysis and the production verifications, the Team reported the production data. The Team also explained, if possible, the differences in the financial analysis ANNEX II.

SUMMARY OF DATA COLLECTION AND VERIFICATION RESULTS FOR EACH ENTERPRISE

CTC 01: Luzhou North Chemical Industrial Co., Ltd.

The company is a chloromethanes (CMs) producer that uses methanol (CH_3OH) and chlorine (Cl_2) as raw materials to produce CTC and chloroform (CM3). Its 2004 CTC production quota is **2,106.00 MT** and verified production is **2,093.80 MT**.

1.1 CTC production, stocks and sales

This plant defines CTC production as the amount of produced CTC transferred from the unfinished product storage tank to the CTC finished product tank. However, the recorded CTC production data were not measured by metering or weighing physically, but determined by making the following mass balance on the CTC finished product tank:

CTC production = CTC sales + closing stock – opening stock

CTC sales data are taken from the plant CTC daily transfer records. CTC is weighed and packaged in tank trucks and some drums as that amount of CTC transferred from CTC finished product storage tank for sale.

CTC opening and closing stocks are taken from the CTC product storage inventory. The plant takes readings on the 23rd day of each month between 8:30 AM and 9:00 AM.

CTC production for both January and February were taken together in this plant because of the Chinese New Year.

1.2 Chlorine (Cl_2) supply and consumption

Gaseous chlorine (Cl_2) is supplied by the chlor-alkali plant of the company and fed directly into the chlorination reactors through a pipeline without use of a storage tank. Therefore, there is no Cl_2 stock inventory recorded in the CMs plant;

Cl_2 consumption = Cl_2 supply.

Cl_2 supply for CMs production is determined by the supplier's Cl_2 allocation balance, based on the following equation:

Cl_2 supply for CMs production = (Total Cl_2 generated from the chlor-alkali plant) – (liquid Cl_2 for sales) – (liquid Cl_2 for water disinfection and hospital sterilization) – (liquid Cl_2 storage closing stock) – (liquid Cl_2 storage opening stocks)

The plant took its data records for both January and February together because of the Chinese New Year.

1.3 Methanol (CH_3OH) supply and consumption

Methanol is purchased from outside and delivered into a feedstock storage tank first, and then added into the CMs reactors.

Methanol consumption is determined by the plant's monthly CH_3OH supply records and CH_3OH storage stock inventories:

CH_3OH consumption = CH_3OH supply – closing stock + opening stock

CH_3OH supply is measured by daily transfer records of CH_3OH from outside to the raw material storage tank. CH_3OH stock inventory is taken on the 23rd day of each month between 8:30 AM to 9:00 AM. For January and February, CH_3OH data were recorded together by the plant due to the Chinese New Year.

1.4 Verification results

Table 1.4.1 Chloromethanes (CMs) production

CMs	CTC	Chloroform	Methylene Chloride	Methyl Chloride
Production, MT	**2,093.80**	3,968.28	0.00	0.00

Table 1.4.2 Raw materials for CMs production

Raw Materials	Opening Stock	Purchased or added to stock	Consumption	Other Uses	Closing Stock
Chlorine, MT	0.00	8,746.66	8,746.66	0.00	0.00
Methanol, MT	43.90	1,637.89	1,669.37*		12.42

Table 1.4.3 CTC production, stocks and sales

Product	Opening Stock	CTC Produced	CTC Sales	Closing Stock
CTC, MT	72.55	**2,093.80***	2,148.97	17.38

Table 1.4.4 Raw material consumption ratios

Ratios	Cl_2/CTC, MT/MT	CH_3OH/CTC, MT/MT
Theoretical	1.38	0.21
Actual	1.59	0.232

The 2004 total **Operating Days is 268.10**. The annual average production of CTC per operating day is 7.81 MT/day.

For further details, please see ANNEX I-Table 01.

1.5 Financial verification results

The financial verification had different results from the production verification. The CTC production verified by the financial verification in fact was the sales by CMs Plant and the sales were the quantity documented on VAT invoices.

For the inconsistency of consumption of chlorine and methylene with the production verification, Luzhou North did not give any reasons.

For more information about the financial verification, please see ANNEX II - CTC 01: Luzhou North Chemical Industrial Co. Ltd.

CTC 02: Zhejiang Juhua Fluorochemical Co., Ltd.

The company is a chloromethanes (CMs) producer that uses both chlorine (Cl_2) and methanol (CH_3OH) as raw materials to produce carbon tetrachloride (CTC), chloroform (CM3), methylene chloride (CM2) and methyl chloride (CM1).

A new methanol based CMs line was installed in October 2004 adding an annual capacity of 45,000 MT (CTC 3,200 MT, CM2 18,400 MT and CM3 18,400 MT) to its existing capacity of 73,500MT. The company now has 3 CMs lines with a total annual capacity of 118,500 MT. Their CTC production quota for 2004 is **14,904.00 MT** and the verified 2004 CTC production is **15,986.01 MT**. However, the plant reports that 1,099.89 MT of the produced CTC was sold as a feedstock to make non-ODS chemicals in 2004.

Most of the CTC produced by the company is sent to its CFC plant to produce both CFC 11 and CFC 12. The total amount of the produced CTC transferred to the CFC plant for internal CFC production is 12,842.62 MT, consistent with the CFC verification.

2.1 CTC production, stocks and sales

CTC produced from 3 CMs lines are integrated together and sent to the plant's unfinished product storage (workshop storage tank) first, and then transferred to the CTC finished product storage after analysis. Disqualified CTC is returned to the system for reprocessing.

CTC production is defined as that amount of qualified CTC transferred from the unfinished product storage tank to the finished product storage tank.

CTC sales are measured by CTC daily packaging and transfer records from the CTC finished product storage tank to the outside for sales. The amount of CTC packaged but not sold is stored in the CTC warehouse and is included in the CTC stock inventory.

CTC stock inventories are taken by the plant at 8:00 AM on the second to last day of each month. The CTC production, sales and stocks obey the following equation:

$$\text{(CTC production)} - \text{(CTC sales)} - \text{(CTC sent for CFC 11/12 production)} = \text{(CTC closing stock)} - \text{(CTC opening stock)}$$

CTC transferred from the finished product storage tank to the CFC plant for producing CFC 11/12 is measured by the plant's CTC daily transfer records.

2.2 Chlorine (Cl_2) 99.8% purity supply and consumption

Cl_2 is supplied by Electrochemical (chlor-alkali) Factory of Juhua Chemical Group Company. The supplied Cl_2 (99.8% purity) is sent to a chlorine feedstock purification tower to remove impurities first, and then added to the CMs reactors by pipeline without the use of a storage tank. Entrained Cl_2 in the purification tower is recycled back to the supplier, and therefore,

$$Cl_2 \text{ added to CMs reactors} = (Cl_2 \text{ supply}) - (Cl_2 \text{ recycled back to the supplier})$$

Cl_2 stocks defined in the plant are the amount of Cl_2 back calculated from the unfinished CTC and CMs products that remain in the CMs production process. Readings are taken at 8:00 AM on the second to last day of each month.

Then, the Cl_2 consumption for CMs production is determined by:

$$Cl_2 \text{ consumption} = (Cl_2 \text{ added to CMs reactors} + \text{opening stock} - \text{closing stock}) \times 99.8\%$$

2.3 Methanol (CH_3OH) supply and consumption

There are two CH_3OH storage tanks in the plant. Methanol is purchased from outside and sent to the CH_3OH storage first, and then added into three CMs reactors.

CH_3OH procured is verified from the plant daily movement records of CH_3OH transferred from outside to the raw material storage tanks.

CH_3OH stocks are taken from the storage inventory (storage #1 + storage #2 + CH_3OH back calculated from the unfinished CTC and CMs products that remain in the process).

CH_3OH consumption is calculated by:

CH_3OH consumption = CH_3OH purchased + opening stock – closing stock

2.4 Verification results

Table 2.4.1 Chloromethanes (CMs) production

CMs	CTC	Chloroform	Methylene Chloride	Methyl Chloride
Production, MT	**15,986.01**	57,579.85	36,586.19	82.01

Table 2.4.2 Raw materials for CMs production

Raw Materials	Opening Stock	Purchased or added to stock	Consumption	Other uses	Closing Stock
*Chlorine, MT	502.42	125,942.69	125,059.63	129.03*	1,005.83
Methanol, MT	232.87	36,429.04	36,190.02	0.00	471.89

* Entrained Cl_2 in the chlorine purification tower is recycled back to the supplier. All Cl_2 consumed in the CMs plant is converted to 100% pure. Cl_2 supplied to the plant and stocks are 99.8% pure.

Table 2.4.3 CTC production, stocks, and sales

Product	Opening Stock	CTC Produced	Internal CFC Uses	CTC sales	Closing Stock
CTC, MT	170.92	**15,986.01**	12,842.62*	2,852.27	462.04

* Sent to CFC plant for CFC 11 and CFC 12 production.

Table 2.4.4 Raw material consumption ratios

Ratios	Cl_2/CTC, MT/MT	CH_3OH/CTC, MT/MT
Theoretical	1.38	0.21
Actual	1.429	0.231

The number of 2004 **Operating Days is 357.70** and the annual average CTC production per operating day is 44.69 MT/day.

For further details, please see ANNEX I-Table 02.

2.5 Financial verification results

The financial verification got the same results as the production verification. For further details, please see ANNEX II - CTC 02: Zhejiang Juhua Fluoro-chemical Co., Ltd.

CTC 03: Liaoning Paning No. 3 Chemical Plant

This plant is a former CTC producer which was closed in 2001 and not visited during the mission.

CTC 04: Chongqing Tianxuan Chemical Co., Ltd.

This plant is a former CTC producer that was closed in December 2003 and not visited during the mission.

CTC 05: Chongqing Tiansheng Chemical Co., Ltd.

This company is a CTC residue distillation plant that treats CTC residue (procured from other CTC producers mainly Chongqing Tianyuan and Luzhou Xinfu) by distillation and sells CTC as a final product. Its 2004 CTC production quota is **177.00 MT** and the actual CTC production is verified as **31.14 MT**.

Note: The company depended upon Chongqing Tianyuan's power and water supply to run its plant and when Tianyuan shut down on April 16th 2004 its production was also stopped. Production resumed in September after alternative power and water supplies were obtained.

5.1 CTC production, stocks and sales

CTC production defined in the plant is the amount of CTC produced from the distillation column and transferred to the CTC product storage tank.

CTC sales are defined as the amount of CTC packaged and moved out of the product storage tank for sales. All CTC is packaged in tank trucks and in drums.

CTC stock inventory is zero because all produced CTC is sold out by end of each month.

5.2 CTC residue supply and consumption

CTC residues purchased from other CTC producers are delivered to the plant's raw material storage tank, and then fed into the plant distillation tower for batch processing.

Raw material supply and consumption are defined as the amount of CTC residue delivered from outside to the raw material storage tank and the amount of CTC residue transferred from the storage tank to the distillation tower.

CTC residue stock inventories are taken at the end of each month.

5.3 Verification results

Table 5.3.1 Raw material consumption

Raw material	Opening Stock	Purchased or added to stock	Consumption	Closing Stock
CTC residue, MT	0.00	141.00	99.42	41.58

Table 5.3.2 CTC production, stocks and sales

Product	Opening Stock	CTC Produced	CTC Sales	Closing Stock
CTC, MT	0.00	**31.14**	31.14	0.00

Table 5.3.3 Raw material consumption ratio

Ratios	CTC residue (raw material)/CTC product, MT/MT
Theoretical	N/A
Actual	0.31

The 2004 total **Operating Days is 101** and the annual average production of CTC per operating day was 0.31 MT/day.

For further details, please see ANNEX I-Table 05.

5.4 Financial verification results

The financial verification results were the same as the production verification except for CTC sales. The financial sales referred to the VAT invoices issued by Chongqing Tiansheng while the production sales referred to the CTC taken from warehouse. In 2003 some buyers received CTC without VAT invoices issued and those sales of CTC were included in the financial sales in 2004. This caused a difference between the financial records and warehouse records. For more information about the financial verification, please see ANNEX II - CTC 05: Chongqing Tiansheng Chemical Co. Ltd.

CTC 06: Chongqing Tianyuan Chemical General Plant

The plant is a dedicated CTC producer that uses chlorine (Cl_2) and natural gas (97% CH_4) to produce CTC with a small amount of chloroform (CM3) as a co-product. The plant has five CMs reactors with a CTC production quota for 2004 of **1,465.00 MT** and its 2004 verified production is **1,429.27 MT**.

note: The plant blew-up due to an in-process NCl_3 accumulation on April 16, 2004 and ceased production after that date. The production line was dismantled in December 2004.The Verification Team visited the site to verify the plant complete closure. Also, the plant provided two sets of pictures and a CD disc of the actual dismantling of the plant with SEPA and local EPA representatives observing the process. The plant also provided us a certificate from local EPA confirming the plant had been closed down (see ANNEX III)

Due to the complete closure, a total amount of 126.25 MT of unfinished chloromethane products (92.34 MT CTC and 33.91 MT CM3) was sold in January 2005. This amount of CTC is accounted as the 2004 production.

The Verification Team is advised that a new methanol based CMs plant is in the process of building at a new location with a capacity of 40,000 MT set to begin operation in the beginning of 2007. They plan to produce in the new plant 5% CTC, 47.5% CM2 and 47.5% CM3 of its 40,000 MT CMs capacity.

6.1 CTC production, stocks and sales

CTC produced from the process is sent to an unfinished product tank for analyzing the product quality first, and then, if qualified, transferred to the finished product storage tanks for packaging (drums or tank trucks) sales.

CTC production is defined as the amount of qualified CTC transferred from the unfinished product tank to the finished product tank. However, no flow meter has been installed between the storage tanks to measure the CTC product output. The plant's CTC production was derived from the following data records:

CTC production = CTC sales + closing stocks – opening stocks + CTC other uses.

CTC sales are verified from daily transfer records of CTC moving from the CTC finished product tank to outside for sale. All CTC is sold in tank truck and drum quantities.

CTC stock inventory is taken between 8:00 AM to 8:30 AM at the last day of each month.

6.2 Chlorine (Cl_2) supply and consumption

Cl_2 supplied by its chlor-alkali plant is fed to five CMs reactors directly by pipeline without the use of a storage tank. No gauge is applied in the plant to measure Cl_2 flow rates from outside to the reactors.

The amount of Cl_2 supplied to CMs production is determined by the supplier based on their total NaOH output, Cl_2 generating ratio from the chlor-alkali process (0.855 MT Cl_2 per MT NaOH) and the following allocation formula:

$$\text{NaOH output} \times 0.855 = \Sigma (P_i \times R_i \times AF_i)$$

Where i = the Cl_2 related product including liquid Cl_2, hydrochloric acid, and chloromethanes; P = output of the product, MT; R = Cl_2 consumption ratio of the product, MT/MT; AF = Cl_2 allocation factor determined by the plant, dimensionless.

Cl_2 opening and closing stocks are defined as the amount of Cl_2 back calculated from the process, including unconsumed raw material and unfinished CTC and CM3 products that remain in the process.

Then, Cl_2 consumption is determined by the plant as:

$$Cl_2 \text{ consumption} = Cl_2 \text{ supply} + Cl_2 \text{ opening stock} - Cl_2 \text{ closing stock}$$

6.3 Natural gas (97% CH_4) supply and consumption

Natural gas, supplied by Chongqing Natural Gas Supply Company, is transferred by pipeline directly to the reactors without use of a storage tank.

Natural gas opening and closing stocks are also back calculated by the plant from the process. Then, natural gas (NG) consumption is determined by:

$$\text{NG consumption} = \text{NG supply} + \text{NG opening stock} - \text{NG closing stock}$$

6.4 Verification results

Table 6.4.1 Chloromethanes (CMs) production

CMs	CTC	Chloroform	Methylene Chloride	Methyl Chloride
Production*, MT	**1,429.27**	83.91	0.00	0.00

* Including the 126.25 MT unfinished products of chloromethanes remaining in the system (92.34 MT CTC and 33.91 MT CM3).

Table 6.4.2 Raw materials for CMs production

Raw Materials	Opening Stock	Purchased or Added to stock	Consumption	Closing Stock
Chlorine, MT	84.81	3,560.14	3,644.94	0.00
Natural gas, Nm^3	9,671.00	383,572.00	393,243.00	0.00

Table 6.4.3 CTC production, stocks and sales

Product	Opening Stock	CTC Produced	CTC Sales	Other Uses	Closing Stock
CTC, MT	635.01	**1,429.27**	*2,064.29	0.00	0.00

* Including the 92.34 MT unfinished CTC products sold in January 2005.

Table 6.4.4 Raw material consumption ratios

Ratios	Cl_2/CTC, MT/MT	Natural gas (97% CH_4)/CTC, Nm^3/MT
Theoretical	1.85	149.73
Actual	2.41	255.79

The 2004 total **Operating Days is 59.32** and the annual average CTC production per operating day is 24.09 MT/day.

For further details, please see ANNEX I-Table 06.

6.5 Financial verification results

The financial verification results were same as the production verification. For further details, please see ANNEX II - CTC 06: Chongqing Tianyuan Chemical General Plant.

CTC 07: Taiyuan Chemical Industrial Co., Ltd.

This plant is a former CTC producer which was closed in 1998 and not visited during the mission.

CTC 08: Luzhou Xinfu Chemical Industry Co., Ltd.

The company is a dedicated CTC producer using chlorine (Cl_2) and natural gas (>90% CH_4) to produce CTC, with a small amount of chloroform (CM3) as co-product. In 2004, its CTC production quota is **4,494.00 MT** and the verified CTC production is **4,488.60 MT**.

note: The plant dismantled one of its five CMs reactors in 2004 at the request of SEPA. The Verification Team visited the plant site and verified that the reactor was removed. Also, the plant provided one set of pictures, one set of video CD and a certificate of dismantling confirming the actual dismantling process with SEPA and local EPA representatives observing (see ANNEX IV).
The plant plans to build a new CH_3OH based CMs production line located at its present plant site. The new line capacity will be 20,000MT/a (CM3/CTC=1:1).

8.1 CTC production, stocks and sales

The plant has one CTC product storage tank and one CTC warehouse (after packaging) for sales.

CTC production is defined as the amount of qualified CTC transferred from the manufacturing process to the CTC product storage and is verified by CTC sales and CTC stocks:

CTC production = CTC sales + closing stock - opening stock

CTC sales are recorded by weighing the product when it is transferred from the CTC product storage tank for packaging and sending to the warehouse for sale. All CTC is packaged in either tank trucks or drums (250 kg).

CTC stock inventories are taken from both CTC product storage and CTC warehouse at 4:00 PM on the 25th day of each month.

8.2 Chlorine (Cl_2) supply and consumption

Gaseous chlorine is supplied by the company's chlor-alkali production unit. The total amount of Cl_2 generated from the production process is allocated by a distribution device

and sent to different applications for producing liquid Cl_2, hydrochloric acid, $FeCl_3$, chlorinated paraffin 52 and chloromethanes, etc.

Supplied Cl_2 is fed into CMs reactors directly by pipeline from the chlor-alkali production unit without the use of a storage tank. No gauge is applied in the plant to measure the amount of Cl_2 supply to CMs production, which is accounted by the plant based on the following equation:

(Cl_2 supplying to CMs production) = (Total Cl_2 generated) – (Internal uses e.g., liquid Cl_2, HCl, chlorinated paraffin 52 and $FeCl_3$ production)

Starting from the year of 2004, the plant accounted the amount of chlorine as raw material stock back calculated from the unfinished CM products remaining in the process, which resulted in a difference of chlorine stocks between the 2004 opening (136.50 MT) and the 2003 closing (0.00 MT).

8.3 Natural gas (>90% CH_4) supply and consumption

Natural gas is supplied by China Petroleum Southwest Natural Gas Field Company. The plant also allocates the total amount of purchased natural gas for different applications of CMs production, NaOH production, and general heating purposes.

The allocated natural gas is fed into CMs reactors directly by pipeline without use of a feedstock storage tank. The amount of natural gas supplied for CMs production is determined by:

CH_4 supply for CMs production = (total CH_4 supply) – (internal uses in the plant for NaOH production and general heating purposes)

Also from the year of 2004 and after, the plant accounted the amount of natural gas as raw material stock back calculated from the unfinished CM products remaining in the process, which resulted in a difference of natural gas stocks between the 2004 opening (15659.40 Nm3) and the 2003 closing (0.00 Nm3).

8.4 Verification results

Table 8.4.1 Chloromethanes (CMs) production

CMs	CTC	Chloroform (CM3)	Methylene Chloride (CM2)	Methyl Chloride (CM1)
Production, MT	**4,488.60**	342.82	0.00	0.00

Table 8.4.2 Raw materials for CMs production

Raw Materials	Opening Stock	Purchased or added to stock	Consumed for CMs	Other uses	Closing Stock
Chlorine, MT	136.50	16,597.12	13,180.95	*3,410.25	142.43
Natural gas (>90% CH_4), Nm^3	15,659.40	2,011,695	1,376,647.4	**636,187	14,520.00

* Internal uses in the plant are for liquid Cl_2, HCl, chlorinated paraffin 52 and $FeCl_3$ production.
** Internal uses in the plant for caustic soda production and general heating usage.

Table 8.4.3 CTC production, stocks and sales

Product	Opening Stock	CTC Produced	CTC sales	Closing Stock
CTC, MT	501.66*	**4,488.60**	3,994.85*	995.41

Table 8.4.4 Raw material consumption ratios

Ratios	Cl_2/CTC, MT/MT	Natural gas (97% CH_4)/CTC, Nm^3/MT
Theoretical	1.85	149.73
Actual	2.73	279.22

The number of 2004 **Operating Days is 334.00** and the annual average production of CTC per operating day is 13.44 MT/day.

For further details, please see ANNEX I-Table 08.

8.5 Financial verification results

The financial verification results of CTC production and sales agreed with production verification although the data is different. 27.719 MT CTC was sold in 2003 but was not documented financially. This caused a difference in opening stock of CTC between financial records and production records. Some CTC was sold in 2004 without VAT invoices, this caused different sales data for financial records and production records. The difference in CTC production was caused by the rounding of decimals.

For verifying the consumption of chlorine and natural gas, the methodologies were different. The financial verification on consumption of chlorine and natural gas was on the basis of CMs production lines (opening stock + purchased or added to production line = consumption + closing stock) while the production verification was on the basis of entire company (opening stock + purchased or added to company = consumption + other uses + closing stock). In fact, purchased or added to production line = purchased or added to company - other uses. Taken into account this consideration, the results of both verifications are the same.

For more information about the financial verification, please see ANNEX II - CTC 08: Luzhou Xinfu Chemical Industry Co. Ltd.

CTC 09: Jiangsu Meilan Chemical Co., Ltd.

The company is a chloromethanes producer that uses both methanol (CH_3OH) and chlorine (Cl_2) as feedstock to produce CTC, chloroform (CM3) and methylene chloride (CM2).

A new CMs production line was installed and commissioned in April 2004 with a capacity of 80,000 MT. The company in 2004 has three CMs lines totaling 150,000 MT capacity. Its 2004 CTC production quota is **3,453.00 MT** and verified production is **3,450.46 MT**.

Also the company has an independent CFC plant that consumes CTC as a feedstock for producing CFC 11 and CFC 12. In 2004, all the produced 3,450.46 MT CTC was transferred to the CFC plant for CFC 11 and CFC 12 production, which is consistent with the finding of the CFC verification.

9.1 CTC production, stocks and sales

CTC produced from the process is sent to an unfinished product storage tank first and then transferred into a finished product storage tank after analyzing its composition. Disqualified CTC is returned to the system for reprocessing.

CTC production is defined as the amount of qualified CTC transferred from the unfinished product storage tank to the finished product tank.

Different from the 2003 verification, in 2004, the plant sent all the produced CTC from CTC finished product tank to the CFC plant by pipeline directly. No CTC sales were made in this plant in 2004, and also no CTC stocks were identified in the CMs plant.

9.2 Chlorine (Cl_2) supply and consumption

Chlorine gas generated from the company's chlor-alkali plant is fed to chloromethane production directly by pipeline without a storage tank. The amount of Cl2 supplied to the CMs reactors is recorded by the plant's raw material daily transfer records.

As this plant did not conduct the back calculation to account the amount of Cl2 remaining in the unfinished CTC and CMs products as raw material stocks. Therefore, no Cl_2 opening and closing stocks are available in the plant, and Cl_2 consumption equals to Cl_2 supply.

9.3 Methanol (CH_3OH) supply and consumption

Methanol is purchased from the outside and sent to a storage tank first and then added into the CMs reactors.

CH_3OH supply is verified from the plant daily transfer records of CH_3OH from the outside supply to the CH_3OH storage tank.

CH_3OH consumption is measured by the daily CH_3OH transfer records from the methanol storage tank to the CMs reactors.

9.4 Verification results

Table 9.4.1 Chloromethanes (CMs) production

CMs	CTC	Chloroform (CM3)	Methylene Chloride (CM2)	Methyl Chloride (CM1)
Production, MT	**3,450.46**	61,008.90	54,802.40	0.00

Table 9.4.2 Raw materials for CMs production

Raw Materials	Opening Stock	Purchased or Added to Stock	Consumption	Closing stock
Chlorine, MT	0.00	125.318.90	125,318.90	0.00
Methanol, MT	72.44	42,977.64	41,676.89	1,373.19

Table 9.4.3 CTC production, stocks, and sales

Product	Opening Stock	CTC Produced	CTC Sales	* Internal CFC Production	Closing Stock
CTC, MT	0.00	**3,450.46**	0.00	3,450.46	0.00

* Sent to CFC plant for CFC 11/12 production.

Table 9.4.4 Raw material consumption ratios

Ratios	Cl_2/CTC, MT/MT	CH_3OH/CTC, MT/MT
Theoretical	1.38	0.21
Actual	1.41	0.23

The number of 2004 **Operating Days is 298** and the annual average CTC production per operating day is 11.58 MT/day.

For further details, please see ANNEX I-Table 09.

9.5 Financial verification results

The financial verification got the same results are the same as the production verification. For further details, please see ANNEX II - CTC 09: Jiangsu Meilan Chemical Co. Ltd.

CTC 10: Guangzhou Hoton Chemical (Group) Co., Ltd.

The company is a former CTC producer, which was closed in 1997, and not visited during the mission.

CTC 11: Sichuan Honghe Fine Chemical Co., Ltd.

The company is a CMs producer that uses chlorine (Cl_2) and methane (CH_4) to produce carbon tetrachloride (CTC), chloroform (CM3), methylene chloride (CM2) and methyl chloride (CM1).

In 2004 the company added a new CMs line (CH_3OH based) having an annual CMs capacity of 60,000 MT producing CTC, CM3, CM2, CM1. The total annual CMs capacity for all production lines (CH_4 – two lines; CH_3OH – one line) is 110,000 MT. The company's CTC production quota for 2004 is **11,941.00 MT** and verified 2004 CTC production is **11,935.78 MT**.

note: Also in 2004, the plant dismantled two of its 12 CMs reactors (methane-based) at the request of SEPA. The Verification Team visited the plant site and verified that the reactors were completely dismantled. The plant provided one set of pictures, one set of video CD and a certificate of dismantling confirming the actual dismantling process with SEPA and local EPA representatives observing (see ANNEX V).

11.1 CTC production, stock and sales:

In 2004, the plant has three CMs production lines with 10 methane-based reactors and 2 methanol-based reactors. All CTC produced is sent to a process storage tank first, then transferred to a CTC finished product storage tank after analysis, and then moved to CTC product warehouse after packaging for sales. By the end of each month, all CTC remaining in the finished product storage tank was either drummed or placed into a storage tank in the CTC warehouse.

CTC production is defined as the amount of qualified CTC product transferred from the process storage tank to the CTC product storage tank.

CTC sales are measured by weighing while packaging and transferring the product from the CTC warehouse to the outside for sale. All CTC is packaged in either tank trucks or in drums (250 kg).

CTC opening and closing stocks are based on the CTC warehouse inventory. Readings are taken by the plant at 5:00 PM on the second to the last day of each month

11.2 Chlorine (Cl_2) supply and consumption

Chlorine is supplied by the chlor-alkali plant of the company. The plant sends Cl_2 to different process units for liquid Cl_2, HCl and CMs production. The amount of Cl_2 sent to

CMs lines is not measured by the CMs plant but calculated by the supplier based on following equation:

Cl_2 sent to CMs plant = (Total Cl_2 generated) – (Cl_2 for liquid Cl_2 and HCl production)

The supplied Cl_2 is fed to chlorination reactors by pipeline directly, without the use of a storage tank. In some cases when Cl_2 from the chlor-alkali plant is not enough for CMs production, the CMs plant purchases Cl_2 from outside. Therefore;

Cl_2 supply for CMs production = (Cl_2 sent from chlor-alkali plant) + (Cl_2 purchased from outside)

Cl_2 opening and closing stocks are back calculated by the plant from the unfinished CTC, CM3, CM2 and CM1 products that remain in the process. Data records are taken from the Cl_2 inventories.

Cl_2 consumption for CMs is then determined by the plant based on the following balance:

Cl_2 consumption = Cl_2 supply for CMs + opening stock – closing stock

11.3 Methane (CH_4) supply and consumption

Natural gas supplied from the outside is purified by adsorption to remove impurities first and then transferred by pipeline directly to the chlorination reactors without a storage tank. Monthly CH_4 supply for CMs production is recorded by the following:

CH_4 supply = Natural gas supply × CH_4 content (monthly average)

CH_4 opening and closing stocks are not measured but back calculated by the plant from unfinished CMs products that remain in the process. Data records are taken from the plant's CH_4 inventories. CH_4 consumption is determined as below:

CH_4 consumption = CH_4 supply + opening stock – closing stock

11.4 Methanol (CH_3OH) supply and consumption

CH_3OH supply is from the outside to the storage tank and then from the storage tank to the reactor.

The purchased amount of CH_3OH is verified by CH_3OH daily transfer records from outside to the storage. CH_3OH stocks are taken from the plant's CH_3OH inventories, and then CH_3OHconsumption is determined as below:

CH_3OH consumption = CH_3OH purchased + opening stocks – closing stocks

11.5 Verification results

Table 11.5.1 Chloromethanes (CMs) production (combined processes)*

*CMs Total	CTC	Chloroform (CM3)	Methylene Chloride (CM2)	Methyl Chloride (CM1)
Production, MT	**11,935.78**	21,119.57	31,797.41	1,578.88

* CMs production total includes both methane-based and methanol-based processes in the plant.

Table 11.5.2.1 Raw materials for CMs production (methane-based process)

Raw Materials	Opening Stock	Purchased or added to stock	Consumption	Closing Stock
Chlorine, MT	877.90	115,566.10	115,825.94	618.06
Methane, Nm^3	132,332.00	18,624,096.08	18,651,139.78	105,288.30

Table 11.5.2.2 Raw materials for CMs production (methanol-based)*

Raw Materials	Opening Stock	Purchased or added to stock	Consumption	Closing Stock
Chlorine, MT	0.00	19,654.96	19,194.29	460.68
Methanol, MT*	1,177.84	6,816.77	6,740.99	1,253.62

* The new CH_3OH-based CMs line was open in 2004.

Table 11.5.3 CTC production, stocks and sales (combined processes)*

Product	Opening Stock	CTC Produced	CTC Sales	Closing stock
CTC, MT	138.14	**11,935.78**	12,041.97	31.95

* CTC produced, stocks and sales include both methane-based and methanol-based processes in the plant.

Table 11.5.4.1 Raw material consumption ratios (methane-based)

Ratios	Cl_2/CTC, MT/MT	CH_4/CTC, Nm^3/MT
Theoretical	1.85	145.24
Actual	2.50	255.59

Table 11.5.4.2 Raw material consumption ratios (methanol-based)

Ratios	Cl_2/CTC, MT/MT	CH_3OH/CTC, MT/MT
Theoretical	1.38	0.21
Actual	1.63	0.24

The number of **Operating Days is 241.78** for 2004 and the annual MT CTC/operating day = 49.37 MT/day.

For further details, please see ANNEX I-Table 11.

11.6 Financial verification results

The results of financial verification were not satisfactory although the CTC production and sales were the same with the production verification.

The results of financial verification of consumption of chlorine, natural gas, and methanol differ from the production verification. However, Sichuan Honghe did not give any reasons. In addition, the financial data was incomplete.

For more information about the financial verification, please see ANNEX II - CTC 11: Sichuan Honghe Fine Chemical Co. Ltd.

CTC 12: Shanghai Chlor-Alkali Chemical Co., Ltd.

The company is a CTC co-producer that uses ethylene (C_2H_4) and chlorine (Cl_2) as raw materials to produce carbon tetrachloride (CTC) and perchloroethylene (PCE). In the process, product output ratios of CTC/PCE + CTC) are adjustable. The ratio ranged from 35% to 90% by recycling the CTC back to the reactor. The company's 2004 CTC production quota is **7,909.00 MT** and the verified 2004 CTC production is **7,909.00 MT**.

12.1 CTC production, stocks and sales

The plant has two CTC unfinished product storage tanks and one CTC finished product tank. CTC produced from the process is fed to the unfinished product tank first, and then, if qualified after analysis, transferred to the finished product storage tank. Disqualified CTC is returned back to the system for reprocessing.

CTC production, as defined in the plant, is the amount of qualified CTC transferred from unfinished product tank to the finished product tank.

CTC stock inventories are taken at 2:30 PM on the last day of each month.

CTC sales are verified from the product daily package and transfer records of CTC from the finished product storage to outside for sales.

12.2 Chlorine gas (Cl_2) supply and consumption

Chlorine gas (Cl_2) is fed to the CTC/PCE reactor directly from the company's chlor-alkali plant by pipeline without a storage tank. The amount of Cl_2 supplied to the reactor is measured by a flow rate gauge. Cl_2 consumption is equal to the amount of Cl_2 supply minus the amount of Cl_2 back calculated from the unfinished CTC and PCE products that remaining in the process. In 2004, the plant conducted the back calculation and accounts it in the Cl_2 stocks.

Note: This reflects more accurately how the plant determines Cl_2 consumption. This was not in the 2003 CTC Verification.

12.3 Ethylene (C_2H_4) supply and consumption

Ethylene (C_2H_4) is supplied by Jingshan Petrochemical Company (50 km away from the plant) and added into the CTC/PCE reactor by pipeline directly from outside without a storage tank. Similar to Cl_2 supply records, daily C_2H_4 supply is measured by a mass flow rate gauge. C_2H_4 consumption is equal to the amount of C_2H_4 supply minus the amount of ethylene back calculated from the unfinished CTC and PCE products that remaining in the process. In 2004, the plant conducted such back calculation and accounted it in C_2H_4 stocks.

note: This reflects more accurately how the plant determines C_2H_4 consumption. This was not included in the 2003 CTC Verification.

12.4 Verification results

Table 12.4.1 CTC and PCE production

CMs	Carbon Tetrachloride (CTC)	Perchloroethylene (PCE)
Production, MT	**7,909.00**	4,283.00

Table 12.4.2 Raw materials for CTC/PCE production

Raw Materials	Opening Stock	Purchased or added to stock	Consumption	Closing Stock
*Chlorine, MT	615.67	21,402.73	22,015.29	3.11
*Ethylene, MT	31.58	1,192.69	1,224.10	0.17

* In 2003 both chlorine and ethylene closing stocks were zero, while in 2004 opening stocks were 615.67 MT and 31.58 MT respectively. In 2003 the CTC Verification Team took statistical data from the production lines only. In the 2004 financial analysis discovered that the plant took into account the amount of chlorine and ethylene remaining in the process and added it to the opening stocks.

Table 12.4.3 CTC production, stocks and sales

Product	Opening Stock	CTC Produced	CTC Sales	Closing Stock
CTC, MT	4.987	**7,909.00**	7,642.72	271.27

Table 12.4.4 Raw material consumption ratios

Ratios	Cl_2/CTC, MT/MT	C_2H_4/CTC, MT/MT
Theoretical	1.38	0.09
Actual	1.67	0.08*

* Actual consumption ratio of C_2H_4/CTC is below the theoretical value. The plant explained that the less amount of ethylene supply was measured and provided by the supplier and they did not correct the C_2H_4 flow rates.

The total 2004 **Operating Days is 355.71** and the annual MT CTC/operating day = 22.23 MT/day.

For further details, please see ANNEX I-Table 12.

12.5 Financial verification results

The financial verification agreed with the production verification results. For further details, please see ANNEX II - CTC 12: Shanghai Chlor-Alkali Chemical Co. Ltd.

CTC 13: Quzhou Jiuzhou Chemical Co., Ltd.

The company is a CTC residue distillation plant that distills CTC residue purchased from its parent company, Zhejiang Juhua Fluorochemical Co., Ltd. and sells CTC as a final product.

In 2004, the plant's production line was moved to a new location and the new plant began production on July 8, 2004. Its CTC production quota for 2004 is **596.00 MT** and the verified 2004 CTC production is **602.50MT**.
note: The company produced 6.5 MT CTC more than its quota in 2004 because the plant changed its data recording system in 2004 and ended its production accounting year on December 25th and six day's production were not included in its annual 2004 production. The company will change its production accounting back to the same as 2003 from January 1st to December 31st in the preceding years.

13.1 CTC production, stock and sales

CTC production defined in the plant is the amount of CTC produced from the distillation columns to the CTC product warehouse.

CTC sales are measured by the product transfer records from the CTC product warehouse to outside for sale. All CTC is packaged in drums.

CTC stock inventories are determined by:

CTC closing stock = CTC opening stock + CTC production – CTC sales

13.2 CTC residue supply and consumption

CTC residue, the plant's raw material, purchased from Zhejiang Juhua Fluorochemical Co., Ltd., is delivered to the plant raw material storage tank first, and then added into distillation columns for recovering CTC in a batch process.

CTC residue supply is defined as the amount of CTC residues transferred from Zhejiang Juhua Fluorochemical Co., Ltd. to the plant's raw material storage tank.

CTC residue opening and closing stocks are taken from the raw material storage inventory, and then the raw material consumption is determined by:

CTC residue consumption = CTC residue supply + opening stock - closing stock

13.3 Verification results

Table 13.3.1 Raw material consumption

Raw material	Opening Stock	Purchased or added to stock	Consumption	Closing stock
CTC residue, MT	20.00	1,219.25	1,074.40	164.85

Table 13.3.2 CTC production, stocks and sales

Product	Opening stock	CTC produced	CTC sales	Closing stock
CTC, MT	113.00	**602.50***	589.25	126.25

* The plant ends its recording of production on the 25th day of each month in 2004. This created an extra six days (26-31st) production in December 2004 that amounted to 6.5 MT and was not reported to SEPA. The plant will change back its recording procedures in the year of 2005 and after.

Table 13.3.3 Raw material consumption ratio

Ratios	CTC residue (raw material)/CTC product, MT/MT
Theoretical	N/A
Actual	1.78

The 2004 total **Operating Days is 335** and the annual production of CTC per operating day is 1.80 MT/day.

For further details, please see ANNEX I-Table 13.

13.4 Financial verification results

The financial verification was different from the CTC production and CTC residue consumption. The reason for this inconsistency is that Quzhou Jiuzhou ended its accounting year on December 25th, 2004. Then an additional 6.5 MT CTC and its CTC residue consumption were included in 2005 rather than 2004. For more information about the financial verification, please see ANNEX II - CTC 13: Quzhou Jiuzhou Chemical Co. Ltd.

CTC 14: Wuxi Greenapple Chemical Co., Ltd.

The company is a CMs producer that uses chlorine (Cl_2) and methanol (CH_3OH) to produce chloroform (CM3), methylene chloride (CM2) and carbon tetrachloride (CTC) as co-products. The plant was built in June 2003 and started producing CMs in August 2003. Its 2004 CTC production quota is **1,140.00 MT** and the verified production is **1,139.28 MT**.

14.1 CTC production, stocks and sales

The produced CTC is sent to an unfinished CTC storage first, and then transferred to the CTC finished product tank after analysis. Disqualified CTC is returned to system for reprocessing.

CTC production is defined as the amount of qualified CTC transferred from the unfinished product storage tank to the finished product storage tank.

CTC sales are measured by daily transfer records of CTC from the finished product storage tank to the outside for sale.

CTC opening and closing stocks are from the CTC product storage inventory. Readings are taken by the plant on the 25th day of each month.

14.2 Chlorine (Cl_2) supply and consumption

Liquid chlorine is supplied by chlor-alkali plant of the company, which is sent to a liquid storage tank first, and then vaporized and fed into CMs reactor by pipeline. No measurement is applied in the plant to measure the amount of liquid Cl_2 transferred from chlor-alkali plant to the liquid Cl_2 tank. Cl_2 supply to CMs production is determined by the following allocation formula:

Cl_2 supply for CMs = Total Cl_2 generated from chlor-alkali process – other uses in the company for producing VCM, PVC, Chlorinated Rubber, HCl and liquid chlorine etc.

Cl_2 opening and closing stocks are taken from the liquid Cl_2 storage tank inventories.

The amount of Cl_2 transferred from the liquid Cl_2 tank to the CM reactor is measured by a flow rate meter and then Cl_2 consumption is determined by the following:

$$Cl_2 \text{ consumption} = Cl_2 \text{ supply} + \text{opening stock} - \text{closing stock}$$

14.3 Methanol (CH_3OH) supply and consumption

Methanol is purchased from the outside. The procured CH_3OH is sent to a storage tank first, and then added into the CMs reactors.

CH_3OH input from the outside to the storage tank is measured and recorded by the plant daily raw material transfer records.

CH_3OH opening and closing stocks are taken from the CH_3OH storage inventory. Then the CH_3OH consumption is determined by:

$$CH_3OH \text{ consumption} = CH_3OH \text{ purchased} + \text{opening stock} - \text{closing stock}$$

14.4 Verification results

Table 14.4.1 Chloromethanes (CMs) production

CMs	CTC	Chloroform (CM3)	Methylene Chloride (CM2)	Methyl Chloride (CM1)
Production, MT	**1,139.28**	12,057.87	12,345.77	0.00

Table 14.4.2 Raw materials for CMs production

Raw Materials	Opening Stock	Purchased or added to stock	Consumption	Closing stock
Chlorine, MT	319.00	26,564.63	26,780.33	103.30
Methanol, MT	121.50	8,876.63	8,965.43	32.70

Table 14.4.3 CTC production, stocks and sales

Product	Opening stock	CTC produced	CTC sales	Other uses	Closing stock
CTC, MT	82.00	**1,139.28**	1,176.04	0.00	45.24

Table 14.4.4 Raw material consumption ratios

Ratios	Cl_2/CTC, MT/MT	CH_3OH/CTC, MT/MT
Theoretical	1.38	0.21
Actual	1.41	0.23

The 2004 total **Operating Days are 311**. The annual production of CTC per operating day is 3.66 MT/day.

For further details, please see ANNEX I-Table 14.

14.5 Financial verification results

The financial verification results were the same as the production verification results except CTC sales. The financial sales only referred to the VAT invoices issued by Wuxi Greenapple while the production sales referred to the CTC taken away from warehouse. Sometimes the buyers did not receive shipment when VAT invoices were issued. This caused the difference between the financial records and warehouse records. For more information about the financial verification, please see ANNEX II - CTC 14: Wuxi Greenapple Chemical Co. Ltd.

CTC 15: Shandong Jinling Group Company

The company is a CMs producer that uses chlorine (Cl_2) and methanol (CH_3OH) to co-produce carbon tetrachloride (CTC), chloroform (CM3) and methylene chloride (CM2).

The plant started producing CMs from October 2003. Its CTC production quota for 2004 is **800 MT** with the verified production of **1721.34 MT**. However, the plant claims that a total amount of 1,044.98 MT of the produced CTC was sold as a feedstock for non-ODS chemical production.

15.1 CTC production, stocks and sales

CTC produced in the process is sent to an unfinished product tank first, and then analyzed. The qualified CTC is transferred to finished product storage for packaging sales.

The definition of CTC production applied in the plant is the amount of CTC transferred from the unfinished product tank to the finished product storage tank by summing up the amount of CTC from the corresponding CTC transfer records. CTC stock inventory is taken by the plant at 8:00 AM each day.

15.2 Chlorine (Cl_2) supply and consumption

Cl_2 is supplied by the company's chlor-alkali unit. Except for CMs applications, the company also sells their liquid chlorine product to other companies. In some cases of the insufficient supply, the plant also purchases Cl2 from outside to meet the needs of CMs production.

Chlorine supply and consumption are verified from the plant's chlorine daily transferred records from outside to Cl_2 storage and from the Cl_2 storage to CMs reactor, that were provided for the verification.

Cl_2 opening and closing stocks are checked by the plant based on the following:

$$Cl_2 \text{ closing stock} = Cl_2 \text{ supply} - Cl_2 \text{ consumption and} + Cl_2 \text{ opening stock}$$

15.3 Methanol (CH_3OH) supply and consumption

CH_3OH is purchased from outside and sent to feedstock storage first, and then fed into the CMs reactor. Daily shift production logs for CH_3OH movement from outside to the CH_3OH storage and from the CH_3OH storage to CMs reactor are recorded by the plant and provided for verification.

Methanol opening and closing stocks are verified on the basis of following:

$$CH_3OH \text{ closing stock} = CH_3OH \text{ supply} - CH_3OH \text{ consumption} + CH_3OH \text{ opening stock}$$

15.4 Verification results

Table 15.4.1 Chloromethanes (CMs) production

CMs	CTC	Chloroform (CM3)	Methylene Chloride (CM2)	Methyl Chloride (CM1)
Production, MT	**1,721.34**	16,237.30	16,987.02	0.00

Table 15.4.2 Raw materials for CMs production

Raw Materials	Opening Stock	Purchased or added to stock	Consumption	Other Uses	Closing Stock
Chlorine, MT	117.94**	38,215.91	37,324.69	816.40*	192.77
Methanol, MT	104.52	13,863.77	13,116.91	500.00	351.38

* Liquid Cl_2 sold to outside.

** In 2003 chlorine supply was based upon CMs plant production and in 2004 chlorine supply was based upon the total chlorine use in the plant.

Table 15.4.3 CTC production, stocks and sales

Product	Opening Stock	CTC produced	CTC sales	Closing stock
CTC, MT	147.74	**1,721.34**	1,867.50	1.58

Table 15.4.4 Raw material consumption ratios

Ratios	Cl_2/CTC, MT/MT	CH_3OH/CTC, MT/MT
Theoretical	1.38	0.21
Actual	1.44	0.25

The 2004 number of **Operating Days is 318** and the annual average CTC production per operating day is 5.41 MT/day.

For further details, please see ANNEX I-Table 15.

15.5 Financial Verification results

The financial verification results agreed with the production verification results based on the following consideration:

- 36.6 MT CTC was produced in last 5 days of December, 2004, that was included in production verification but not recognized by financial verification.
- 91.08 MT CTC was taken away from warehouse and treated as sales by production verification in 2003 but was recognized by financial verification in 2004.
- 26.2068 MT chlorine was treated by production verification as closing stock of 2003 but as increase to stock in 2004 by financial verification.

For more information about the financial verification, please see ANNEX II - CTC 15: Shandong Jinling Group Company.

CTC 16: Shandong Dongyue Fluorine & Silicon Material Co., Ltd.

The company is a new CMs producer that uses methanol (CH_3OH) and chlorine (Cl_2) as raw materials to produce CTC, chloroform (CM3) and methylene chloride (CM2). The new chloromethane plant started production in November 2004. Its CMs capacity is 42,000 MT (2,000 MT CTC, 30,000 MT CM3 and 10,000 CM2). Its 2004 CTC production quota is **300 MT** and verified production is **309.80 MT**.

16.1 CTC Production, stocks and sales

CTC produced from the CM process is sent to an unfinished CTC storage tank first. After analysis, the qualified CTC is then transferred into a CTC product storage tank. CTC production is defined as the amount of qualified CTC transferred from unfinished storage to the finished product tank. Original data are taken from the plant's product transfer records.

CTC is then transferred to packaging for sales. CTC sales are verified from the CTC product packaging records from the finished product storage to outside for sale.

CTC stocks are determined by the following balance checking:

$$\text{Closing stock} = \text{CTC production} + \text{Opening stocks} - \text{CTC sales}$$

16.2 Chlorine (Cl_2) supply and consumption

Cl_2 is purchased from a chlor-alkali company located near the plant site. Cl_2 gas is fed directly by a pipe line to the CMs reactor from the chlor-alkali plant. A meter is used to measure the amount of Cl_2 fed into the reactor. There is no physical storage of Cl_2 on the plant site.

The company did not account the amount of chlorine back calculated from unfinished CM products that remain in the process as the raw material stocks, and therefore,

$$Cl_2 \text{ consumed} = Cl_2 \text{ supplied}$$

16.3 Methanol (CH_3OH) supply and consumption

CH_3OH is purchased from the outside and stored in a storage tank. CH_3OH is then fed directly into the CMs reactor. CH_3OH consumption is measured from the storage tank transfer records by the following equation:

$$CH_3OH \text{ consumption} = CH_3OH \text{ supply} + \text{Opening stocks} - \text{Closing stocks}$$

Note: The plant recorded CTC, Cl_2 and CH_3OH transfers on January through November on the 28th day of each month at 8:00 AM and in December on the 31st day at 12:00 PM.

16.4 Verification results

Table 16.4.1 Chloromethanes (CMs) production:

CMs	CTC	Chloroform (CM3)	Methylene Chloride (CM2)	Methyl Chloride (CM1)
Production,MT	**309.80**	1,547.83	1,025.33	0.00

Table 16.4.2 Raw materials for CMs production

Raw Material	Opening Stocks	Purchased or added to stock	Consumption	Closing Stocks
Chlorine (Cl_2), MT	0.00	2,379.68	2,379.68	0.00
Methanol (CH_3OH), MT	0.00	1,797.92	912.21	885.71

Table 16.4.3 CTC Production, stocks and sales

Product	Opening Stocks	CTC Produced	CTC Sales	Closing Stock*
CTC, MT	0.00	**309.80**	298.00	11.80

* The actual amount of CTC closing stocks remaining in the plant were zero by end of 2004. The plant explained that an 11.80 MT storage tank reading error was introduced when taking 720 observations of the level of CTC in the storage tank.

Table 16.4.4 Raw Material Consumption Ratios

Ratios	Cl_2/CTC, MT/MT	CH_3OH/CTC, MT/MT
Theoretical	1.38	0.21
Actual	1.05	0.22

The 2004 number of **Operating Days is 30.80** and the annual average CTC production per operating day is 10.06 MT CTC/day.

For further details, please see ANNEX I-Table 16.

16.5 Financial Verification results

The financial verification had different results with the production verification in terms of CTC production, chlorine consumption, and methanol consumption. However, Shandong Dongyue did not provide any reasons.

For more information about the financial verification, please see ANNEX II - CTC 16: Shandong Dongyue Fluorine & Silicon Material Co., Ltd.

ANNEX

ANNEX I CTC 01: **Luzhou North** 2004 CTC Production Verification Report

ANNEX I CTC 02: **Zhejiang Juhua** 2004 CTC Production Verification Report

ANNEX I CTC 05: **Chongqing Tiansheng** 2004 CTC Production Verification Report

ANNEX I CTC 06: **Chongqing Tianyuan** 2004 CTC Production Verification Report

ANNEX I CTC 08: **Luzhou Xinfu** 2004 CTC Production Verification Report

ANNEX I CTC 09: **Jiangsu Meilan** 2004 CTC Production Verification Report

ANNEX I CTC 11: **Sichuan Honghe** 2004 CTC Production Verification Report

ANNEX I CTC 12: **Shanghai Chlor-Alkali** 2004 CTC Production Verification Report

ANNEX I CTC 13: **Quzhou Jiuzhou** 2004 CTC Production Verification Report

ANNEX I CTC 14: **Wuxi Greenapple** 2004 CTC Production Verification Report

ANNEX I CTC 15: **Shandong Jinling** 2004 CTC Production Verification Report

ANNEX I CTC 16: **Shandong Dongyue** 2004 CTC Production Verification Report

ANNEX II: Financial Verification of 2004 CTC Production in China

ANNEX III: Documentation of plant dismantling in Chongqing Tianyuan*

1) Certificate of dismantling
2) Two sets of photos
3) One set of video CD

ANNEX IV: Documentation of one reactor dismantling in Luzhou Xinfu*

1) Certificate of dismantling
2) One set of photos
3) One set of video CD

ANNEX V: Documentation of two reactors dismantling in Sichuan Honghe*

1) Certificate of dismantling
2) One set of photos
3) One set of video CD

* All listed documentation of dismantling was physically submitted to the World Bank together with the Verification Report.

CHINA PROCESS AGENT SECTOR PLAN

PHASE I

2004 Consumption of CTC and CFC-113 in PA Sector (Phase 1)

Verification Report

World Bank

April 2005

I INTRODUCTION

As requested by the Agreement between China and the Executive Committee of the Multilateral Fund for the Process Agent Sector Plan, Phase I, the annual production and consumption of CTC and consumption of CFC-113 must be verified independently by the World Bank. This report provides an update of the 2004 verification work covering the consumption of CTC and CFC-113.

Consistent with the requirement, the World Bank appointed an independent verification team for the consumption of CTC and CFC-113 verification. The verification team consisted of one technical expert from Canada and one financial analyst from China to conduct the verification.

As guided by the World Bank's Terms of Reference (TOR) of March 2005 mission on PA plant verification, the mission visited 19 enterprises from March 15 to April 11, 2005. The names of the 19 enterprises and verification activities are listed in Table 1 below.

Table 1 Summary of visited PA enterprises and verification activities

Sector Plan #	Name of Enterprise Visited	Verification Activities		Visiting Date
		PA Consumption	Plant Closure	
1	Shanghai Dihe Chemical Plant	●		April 2, 2005
2	Guangzhou Haotian Chemical (Group) Co. Ltd	●	●	Mar 26-27, 2005
3	Wuxi Greenapple Chemical Co. Ltd	●	●	April 3, 2005
4	Zhejiang Xin'an Chemical and Industrial Co. Ltd.*	●●		Mar 29-30, 2005
5	Jiangsu Fasten Fine Chemical Co. Ltd	●		April 4, 2005
N/A	Fujian Wantaixing Chem. Development Co. Ltd.	●		Mar 24-25, 2005
18	Shenyang Chemical Co. Ltd.	●	●	March 17, 2005
21	Longchang Shenghua Chemical Plant.	●	●	April 9, 2005
22	Chongqing Tiansheng Chem. Co. Ltd**		●	April 8, 2005
24	Dalian JX Chemical-Industrial Co. Ltd	●	●	Mar 19-20, 2005
71	Huanghua Jinhua Chemical Co. Ltd	●	●	Mar 21-22, 2005
51	Jilin Chemical Industrial Co. Ltd	●		Mar 15-16, 2005
59	Huahai Pharmaceutical Co. Ltd.		●	March 31, 2005
N/A	Jiangsu Anbang Group Corporation		●	April 6, 2005
N/A	Jiangsu Liyang Guanghua Chem. Co. Ltd		●	April 5, 2005
56	Shanghai 3F New Material Co. Ltd.***	●●		April 1, 2005
57	Chenguang Chemical Research Institute	●		April 10, 2005
167	Jinan 3F Fluoro-Chemical Co. Ltd.	●		Mar 22-23, 2005
169	Fuxin Fluoro-Chemical Co. Ltd.	●		Mar 18, 2005

Notes: * The plant has both CR and CP-70 lines that were under production in 2004.
** Sector Plan number of the enterprise is #22 based on Chongqing Tianyuan Chemical General Factory.
*** Shanghai 3F has two PTFE plants (Sector Plan #: 56 and 166) that were under production in 2004.

II METHODOLOGY OF VERIFICATION

The World Bank mission took the following steps at each enterprise, with accompanied by officers of State Environmental Protection Administration (SEPA), for verification of the CTC and CFC-113 consumption and/or the PA plant closures in 2004:

- Listened to the enterprise management's introduction of enterprise, plant history, and plant activities in 2004[1];
- Checked CTC and CFC-113 purchase orders, daily movement records (transferred from outside to PA warehouse and added from PA warehouse to workshop storage);
- Checked opening and closing stock inventories of CTC and CFC-113 in plant warehouse and in workshop storages for each month in 2004;
- Checked daily production logs and movement records (from production line to product warehouse and from product warehouse to outside for sales) for all final product(s) that used CTC and CFC-113 in 2004;
- Checked product packing records, stock inventory and selling records from production workshop and plant warehouse for all final product(s) that used CTC and CFC-113 in 2004;
- Checked accounting system reliability and all financial records related to the CTC and CFC-113 purchase, storage and transfer in 2004;
- Checked accounting records and VAT receipts of all final products' production, transfer, inventory and sales that consumed CTC and CFC-113 as a process agent;
- Checked all documents and activities related to the plant closures (if applicable) including the contract signed with SEPA, date of production stop, date of plant dismantling, remaining CTC treatment, complete closure report, line dismantling certificate, and labor compensation, etc. as required by the mission TOR.
- Visited production line and dismantling site, and took videos and photos;
- Visited raw material and CTC/CFC-113 warehouse and took video and photos;
- Visited final product warehouse and took video and photos;

Once all of the above was completed, the verification team would determine whether or not the enterprise's 2004 CTC and CFC-113 consumption data and/or the plant closure were verified.

If there were any irresolvable data differences between the financial analysis and the production verification, the team reported the result verified from the production data. The team also explained, if possible, the difference in the financial analysis Annex III.

[1] Statistic data of annual production, PA consumption, and line operating days from 2001 (baseline year) to 2003 (previous year) are also collected at each visited plant for verification report information.

III CONCLUSION

The mission verified each of the 15 PA enterprises that received PA consumption quotas from SEPA and were under production in 2004, and verified each of the 10 plant closures that dismantled their production lines in 2004 (see Table 1 above).

The conclusion and major findings from the verification are as below:

1 ***General conclusion:*** The verified purchase and consumption of CTC and CFC-113 in 2004 was within the limits set by the Agreement between The People Republic of China and the Executive Committee of the Multilateral Fund. Detailed results are summarized in Table 2 below.

2 ***CTC purchase and consumption:*** The overall purchase and consumption of CTC in 2004 was 3885.76 ODP tonnes (3,532.51 MT ODS) and 3433.02 ODP tonnes (3,120.93 MT ODS) respectively, which was below the allowed consumption (5049 ODP tonnes) of CTC in the PA Sector in 2004 as per the Agreement with ExCom. Detailed figures and financial analysis are reported in separated file folders (see Annex I and Annex III).

3 ***CFC-113 purchase and consumption:*** The overall purchase and consumption of CFC-113 in 2004 was 10.80 ODP tonnes (13.50 MT ODS) and 10.79 ODP tonnes (13.49 MT ODS) respectively, which was below the allowed consumption (14 ODP tonnes) of CFC-113 in the PA Sector in 2004 as per the Agreement with ExCom. Detailed figures and financial analysis are reported in separated file folders (see Annex I and Annex III).

4 ***PA Plant closures:*** In 2004 there were 10 enterprises[2] closed and dismantled their CTC PA-based production lines or converted them into non-ODS processes without using CTC. Total amount of CTC phased out by the plant closures was 1,090.80 ODS tonnes. Detailed figures are summarized in Table 3 below. Closure verification reports for each individual enterprise are presented a separated file folder (see Annex II).

5 ***CTC emission control in CSM process:*** The mission confirms that a new CSM line[3] with a capacity of 3,000 MT/a has been constructed in CCF (Calcium Carbide Factory) plant of Jilin Chemical Industrial Co. Ltd. and put into trial production in December 2004. The new line aims to reduce CTC emission from current level of 350-370 kg/MT to 60 kg/MT. However, trial productions show that one set of key equipment (dry extrusion system) of the new line does not work well and CTC emission remains high without significant reduction. The plant is trying to address the issue and the new line is still in trial production.

[2] Zhejiang Xin'an is not verified as closure because its CP-70 production line was partially dismantled only. Also its closure documentation was not satisfied with requirements of the contract signed with SEPA.
[3] The new CSM line belongs to PetroChina Jilin Petrochemical Company.

6 ***Major findings (a) – One CTC PA application covered by Decision X/14:*** The mission identified that, in 2004, a total of 1.25 MT CTC was used in synthesis plant of Shenyang Chemical Co. Ltd. (#18) as a process agent for removing NCl3 from liquid chlorine production. This application was outlined by Decision X/14 (listed No.1 of the 25) but not reported in China. Such application should be further investigated and appended to the PA Sector (Phase I).

7 ***Major findings (b) - Illegal uses of CTC for cleaning purpose:*** The mission identified that, in 2004, a total of 3.25 MT CTC was used in fertilizer plant and ethanediol plant of Jilin Chemical Industrial Co., Ltd. (#51) as a solvent for cleaning purpose under its CTC PA consumption quota. This kind of use of CTC should be strictly banned.

8 ***Major finding (c) - Unqcceptable CTC trades between PA plants and unlicensed vendors:*** The mission identified that, in 2004, two PA enterprises (Jilin Chemical and Fujian Wantaixing) purchased their CTC (more than 1,000 MT) from unlicensed CTC vendors. Considering that 2004 was the first year of implementing CTC sales license system, it is understood some trading companies need a period of time to sell their inventories of CTC. However, Jilin Chemical (#51) purchased 907.753 MT of CTC from unlicensed company in the last 3 months in 2004. These purchases are unacceptable. This indicates that illegal trades and/or illegal productions of CTC might exist in China and needs to be adverted.

9 ***Major finding (d) – Different understanding of CTC consumption:*** The mission had a different understanding of CTC consumption with SEPA. From their point of view, *CTC CONSUMPTION* is defined as *CTC PURCHASE*. So they issued CTC consumption quota for controlling the amount of CTC purchased by PA enterprises. One of the results of this definition was that some PA enterprises purchased large amount of CTC by the end of 2004 (e.g. Zhejiang Xin'an purchased 100 MT of CTC and Jiangyin Fasten purchased 210 MT of CTC) for future uses. Therefore, when China stops the *CTC CONSUMPTION* as required by the Agreement, these enterprises could continue their production consuming CTC for at least one year.

Table 2 Summary of verified CTC and CFC-113 consumption in 2004 (in MT ODS)

Sector Plan No.	Application	Enterprise	PA opening stock	PA closing stock	Purchase of PA	Consumption of PA	Other uses of PA
CTC Consumption (Figures in brackets are ODP tonnes)					**3,532.51** (3,885.76)	**3,120.93** (3,433.02)	**43.78** (48.16)
1	CR	Shanghai Dihe Chemical Plant	27.44	103.52	236.77	160.69	0.00
2	CR	Guangzhou Haotian Chemical (Group) Co. Ltd.	89.63	64.30	240.00	265.33	0.00
3	CR	Wuxi Greenapple Chemical Co. Ltd.	28.27	0.00	0.00	10.19	18.08*
4	CR CP-70	Zhejiang Xin'an Chem. & Industrial Co. Ltd.	37.41	145.02	338.25	230.64	0.00
5	CR	Jiangsu Fasten Fine Chemical Co. Ltd.	38.70	585.45	760.50	213.75	0.00
N/A	CR	Fujian Wantaixing Chem. Development Co. Ltd.	22.00	81.39	388.00	328.61	0.00
71	CP-70	Huanghua Jinhua Chemical Co. Ltd	17.25	0.00	12.00	29.25	0.00
18	CP-70	Shenyang Chemical Co. Ltd.	29.69	0.00	1.25	8.49	22.45**
21	CP-70	Longchang Shenghua Chemical Plant	6.51	2.30	15.01	19.22	0.00
22*	CP-70	Chongqing Tiansheng Chemical Co. Ltd	0.00	0.00	0.00	0.00	0.00
24	CP-70	Dalian JX Chemical-Industrial Co. Ltd.	13.45	5.58	197.16	205.03	0.00
51	CSM	Jilin Chemical Industrial Co. Ltd.	546.59	237.18	1,343.57	1649.73	3.25***
59	Keto-tifen	Huahai Pharmaceutical Co. Ltd.	0.00	0.00	0.00	0.00	0.00
N/A	Endo-sulphan	Jiangsu Anbang Group Corporation	0.00	0.00	0.00	0.00	0.00
N/A	Endo-sulphan	Jiangsu Liyang Guanghua Chem. Co. Ltd	0.00	0.00	0.00	0.00	0.00
CCF-113 Consumption (Figures in brackets are ODP tonnes)					**13.50** (10.80)	**13.49** (10.79)	**0.00** (0.00)
56 166	PTFE	Shanghai 3F New Material Co. Ltd.	0.00	0.00	7.00	7.00	0.00
57	PTFE	Chenguang Chemical Research Institute	1.61	1.12	0.00	0.49	0.00
167	PTFE	Jinan 3F Fluoro-Chemical Co. Ltd.	0.5	0.00	4.00	4.50	0.00
169	PTFE	Fuxin Fluoro-Chemical Co. Ltd.	1.00	2.00	2.50	1.50	0.00

Notes: * Sold to licensed CTC users in July 2004.
** Self uses in the company for NCl3 removal, sold to licensed CTC user, and lost in plant dismantling.
*** Self uses in the company for cleaning purposes in fertilizer plant and ethanediol plant.

Table 3 Summary of verified plant closures in 2004

Sector Plan No.	Applica-tion	Name of Enterprise	Contract number	Signing date	Date of dismantling	CTC phase-out* (MT)
2	CR	Guangzhou Haotian Chemical (Group) Co. Ltd.	F-III-S-2003-90	11/08/03	Dec 2004	218.00
3	CR	Wuxi Greenapple Chemical Co. Ltd.	F/III/S/04/015	11/08/03	Sept 2004	313.00
71	CP-70	Huanghua Jinhua Chemical Co. Ltd	F/III/S/04/078	08/03/04	Nov 2004	136.50
18	CP-70	Shenyang Chemical Co. Ltd.	F-III-S-2003-95	11/08/03	Oct 2004	48.00
21	CP-70	Longchang Shenghua Chemical Plant	F-III-S-2003-97	11/08/03	May 2004	73.00
22	CP-70	Chongqing Tiansheng Chem. Co. Ltd	F-III-S-2003-98	11/08/03	Dec-03	45.00
24	CP-70	Dalian JX Chemical-Industrial Co. Ltd.	F-III-S-2003-100	11/08/03	Nov-04	233.00
59	Keto-tifen	Huahai Pharmaceutical Co. Ltd.	No contract signed with SEPA till the mission visit (the plant converted its Ketotifen production line to a non-ODS process based on its own cost.)			
N/A	Endo-sulphan	Jiangsu Anbang Group Corporation	F/III/S/04/142	07/13/04	Sep-04	24.30
N/A	Endo-sulphan	Jiangsu Liyang Guanghua Chem. Co. Ltd	F/III/S/04/200	10/29/04	Jan-05	0.00

Notes: * Based on average CTC consumption over 1998-2000.

IV VERIFICATION REPORT FOR EACH OF THE 19 ENTERPRISES

CHLORINATED RUBBER PRODUCTIONS

CR#1: Shanghai Dihe Chemical Plant

1.1 Enterprise background

Shanghai Dihe Chemical Plant (Shanghai Dihe) is an independent company established in 2002, under its mother company Shanghai Chlor-Alkali Co. Ltd. (Shanghai Chlor-Alkali).

The plant's chlorinated rubber (CR) production unit was installed in 1964 (based on Shanghai Chlor-Alkali) with annual capacity of 100 tons per year. With several expansions in 1994, 2001 and 2003, the unit reached current capacity of 500 MT/a.

Raw materials used in the plant are natural rubber and chlorine. CTC is used a process agent for dissolving natural rubber and recycled in the process for chlorination reaction. Its 2004 CTC consumption quota received from SEPA is 350 MT ODS.

1.2 Verification

The verification team visited the plants on April 2, 2005 with accompanied by Gong Xingming (SEPA officer). Name of the director and his contact information is as below:

Mr. Lu Qun:	Plant Manager
Telephone:	021-64343296, 13501721800
Fax:	021-64341723
Address:	4800 Longwu Road, Minghan District, Shanghai 200241, China

The following steps were taken to verify CTC consumption in 2004:

- Listened to the plant management's introduction on plant history, plant identification, and plant activities on CR production and CTC consumption in 2004;
- Verified CTC purchase from daily movement records of CTC transferred from outside to the plant warehouse;
- Verified CTC opening and closing stocks from monthly CTC inventory (including the amount of CTC stored in plant warehouse and remaining in workshop storages);
- Verified CTC consumption = CTC purchase + CTC opening stock – CTC closing stock;
- Verified CR production and sales from product daily packing records and product daily transfer records (from production line to warehouse and from warehouse to outside for sales);

- Verified CR opening and closing stocks from monthly product stock inventory;
- Verified number of operating days from daily production logs.
- Concurrently, a financial verification was conducted in financial department by reviewing and checking the plant's accounting system's reliability, the plant's annual reports and all VAT receipts related to the CTC purchase, storage and transfer, and the accounting records of CR production, transfer and sales in 2004.
- Visited CR production line and CTC storages in workshop, took video and photos;
- Visited raw material and CR, CTC warehouses, took video and photos;

1.3 Conclusion

Table 1.3.1 CTC purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
27.44	236.77	160.69	0.00	103.52

* Including the amount of CTC stored in the plant warehouse and remaining in the workshop storages.

** Self uses in the plant for other applications.

Table 1.3.2 CR production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
57.94	425.10	445.94	0.00	37.10

* Self uses in the plant for other applications.

The number of 2004 operating days is 355.67 days. The average CTC consumption ratio over the year of 2004 is 0.38 MT CTC/MT CR.

For further details, please see Annex I (File: Annex I_CR#1_Shanghai Dihe).

1.4 Financial verification summary

There are no any discrepancies between financial verification and production verification. For further details, please see Annex III, Para. 112 to 117.

CR#2: Guangzhou Haotian Chemical (Group) Co., Ltd.

2.1 Enterprise background

Guangzhou Haotian Chemical (Group) Co. Ltd. (Guangzhou Haotian) was established in 1956. Chlorinated rubber (CR) production unit was installed in 1979 with a capacity of 100 MT/a. After expansion, the unit reached annual capacity of 500 MT/a in 1990.

Raw materials used in the plant are natural rubber and chlorine with CTC as a process agent. In 2004, the enterprise received CTC consumption quota of 250 MT ODS.

The plant signed contract with SEPA to close the chlorinated rubber production unit by end of 2004. Complied with requirements of the contract, the plant stopped chlorinated rubber production in November and dismantled the unit in December 2004.

2.2 Verification

The verification team visited the plants on March 26-27, 2005 with accompanied by Li Yunpeng (SEPA officer). Name of the director and his contact information is as below:

Mr. Li Fan:	Vice General Manager
Telephone:	020-85525216
Fax:	020- 85534897
Address:	368 Huangpu Road, Guangzhou City, Guangdong 510655, China

The following steps were taken to verify CTC consumption and CR plant closure in 2004:

- Listened to the plant management's introduction on plant history, plant identification, and plant activities on CR production and CTC consumption in 2004;
- Checked all documents related to the plant closure activities in 2004;
- Verified CTC purchase from daily movement records of CTC transferred from outside to the plant warehouse;
- Verified CTC opening and closing stocks from monthly CTC inventory (including the amount of CTC stored in plant warehouse and remaining in workshop storages);
- Verified CTC consumption = CTC purchase + CTC opening stock – CTC closing stock;
- Verified CR production and sales from product daily packing records and product daily transfer records (from production line to warehouse and from warehouse to outside for sales);
- Verified CR opening and closing stocks from monthly product stock inventory;
- Verified number of operating days from daily production logs.
- Concurrently, a financial verification was conducted in financial department by reviewing and checking the plant's accounting system's reliability, the plant's annual reports and all VAT receipts related to the CTC purchase, storage and transfer, and the accounting records of CR production, transfer and sales in 2004.
- Visited CR production unit dismantling site, and took video and photos;

2.3 Conclusion

Table 2.3.1 CTC purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
89.63	240.00	265.33	0.00	64.30

* Including the amount of CTC stored in the plant warehouse and remaining in the workshop storages.

** Self uses in the plant for other applications.* Self uses in the plant for other applications.

Table 2.3.2 CR production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
71.64	289.04	181.96	0.00	178.72

* Self uses in the plant for other applications.

The number of 2004 operating days is 287.00 days. The annual average CTC consumption ratio in 2004 is 0.92 MT CTC/MT CR.

The mission visitors' physical inspection on dismantled CR production sites shows that the plant has fully dismantled the CR production line as required by the contract.

For further details, please see Annex I (File: Annex I_CR#2_Guangzhou Haotian) and Annex II, Page 17 to 19.

2.4 Financial verification summary

The discrepancies between financial verification and production verification could be explained by Guagzhou Haotian. For further details, please see Annex III, Para. 84 to 94.

CR#3: Wuxi Greenapple Chemical Co., Ltd.

3.1 Enterprise background

Wuxi Greenapple Chemical Co., Ltd. (Wuxi Greenapple) installed its chlorinated rubber production line in 1994 with annual capacity of 1,000 MT/a. No expansion was made to the production unit until it was dismantled.

Raw materials used in the plant for chlorinated rubber production are natural rubber and chlorine with CTC as a process agent. In 2004, its CTC consumption quota is 30 MT ODS.

The enterprise signed closure contract with SEPA to close the chlorinated rubber line by end of 2004. In comply with the requirements, the plant stopped chlorinated rubber production in April and dismantled the production unit in September 2004.

3.2 Verification

The verification team visited the plants on April 3, 2005 with accompanied by Feng Liulei (SEPA officer). Name of the director and his contact information is as below:

Mr. Jiang Xujun:	Deputy Manager of Technology Department
Telephone:	0510-3101601 ext. 81411 and 0510-3513870
Fax:	0510-3101678
Address:	274 Xicheng Road, Wuxi City, Jiangsu 214041, China

The following steps were taken to verify CTC consumption and CR unit closure in 2004:

- Listened to the plant management's introduction on plant history, plant identification, and plant activities on CR production and CTC consumption in 2004;
- Checked all documentation related to the plant closure activities in 2004;
- Verified CTC purchase from daily movement records of CTC transferred from outside to the plant warehouse;
- Verified CTC opening and closing stocks from monthly CTC inventory (including the amount of CTC stored in plant warehouse and remaining in workshop storages);
- Verified CTC consumption = CTC purchase + CTC opening stock – CTC closing stock;
- Verified CR production and sales from product daily packing records and product daily transfer records (from production line to warehouse and from warehouse to outside for sales);
- Verified CR opening and closing stocks from monthly product stock inventory;
- Verified number of operating days from daily production logs.
- Concurrently, conducted a financial verification in financial department by reviewing and checking the plant's accounting system's reliability, the plant's annual reports and all VAT receipts related to the CTC purchase, storage and transfer, and the accounting records of CR production, transfer and sales in 2004.
- Visited CR production unit dismantling site, and took video and photos;

3.3 Conclusion

Table 3.3.1 CTC purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
28.27	0.00	10.19	18.08	0.00

* Including the amount of CTC stored in the plant warehouse and remaining in the workshop storages.

** Sold to Taixing City Lantian Special Cable Co. Ltd. (licensed CTC consumer) in July 2004 due to the plant closure.

Table 3.3.2 CR production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
50.49	42.45	92.94	0.00	0.00

* Self uses in the plant for other applications.

The number of 2004 operating days from January to April is 63.00 days. The average CTC consumption ratio over the period is 0.24 MT CTC/MT CR.

The mission visitors' physical inspection on production site of the dismantled chlorinated rubber unit shows that the plant has completely dismantled its chlorinated rubber production unit as required by the contract.

For further details, please see Annex I (File: Annex I_CR#3_Wuxi Greenapple) and Annex II, Page 20 to 22.

3.4 Financial verification summary

Financial verification has different results with production verification.

The different opening stock of CR production between financial verification and production verification is due to the time difference for recording sales of CR in 2003. The difference of CR production between financial verification and production verification is due to the purchase of CR.

For further details, please see Annex III, Para. 118 to 125.

CR#4: Zhejiang Xin'an Chemical and Industrial Co. Ltd.

(Same Company as CP#4)

4.1 Enterprise background

Zhejiang Xin'an Chemical and Industrial Co. Ltd. (Zhejiang Xin'an) has two production lines that consume CTC as a process agent, one is chlorinated rubber production line and the other is chlorinated paraffin-70 production line. Both lines were installed in a same building and organized production by same workshop of the plant.

The chlorinated rubber production line was constructed in 1985 with initial capacity of 100 MT/a. With expansions in 1993 and 1996, production capacity of the unit was expanded to 500 MT/a.

The chlorinated paraffin-70 production line was installed in 1986 with annual capacity of 150 MT/a. After two expansions in 1994 and 1996, the unit reached annual capacity of 500 MT/a.

Raw materials used in the plant for CR and CP-70 productions are natural rubber, semi-

refined paraffin wax and chlorine. CTC is added to and recycled in the process as a process agent for chlorination reaction. Its total CTC consumption quota for running the two production lines in 2004 is 350 MT ODS.

The enterprise signed contract with SEPA to close its chlorinated paraffin-70 production uline by end of 2004. However, the mission did not verify its closure because (1) the CP-70 unit was partially dismantled only; (2) the key equipment of the unit was not fully destroyed; and (3) the plant closure documentation was not satisfied with requirements of their signed contract.

4.2 Verification

The verification team visited Zhejiang Xin'an on March 29-30, 2005 with accompanied by Li Yunpeng (SEPA officer). Names of directors and their contact information are as follow:

Mr. Wang Qunxiao:	Vice General Manager
Mr. Xu Zhihua:	Manager of Chemical Plant
Telephone:	0571-64723891
Fax:	0571-64726063
Address:	93 Baisha Road, Jiande City, Zhejiang 311600, China

The following steps were taken to verify CTC consumptions in 2004:

- Listened to the plant management's introduction on plant history, plant identification, and plant activities in 2004;
- Verified CTC purchase amount from daily movement records of CTC transferred from outside to the plant warehouse;
- Verified CTC opening and closing stocks from monthly CTC inventories (including the amount of CTC stored in plant warehouse and remaining in production storages);
- Verified CTC consumption = CTC purchase + CTC opening stock – CTC closing stock, for CR and CP-70 production respectively;
- Verified CR and CP-70 productions and product sales from daily packing records and daily transfer records (from production line to warehouse and from warehouse to outside for sales);
- Verified CR and CP-70 opening and closing stocks from monthly product stock inventories;
- Verified number of operating days for both CR and CP-70 units from their daily production logs.
- Concurrently, conducted a financial verification in financial department by reviewing and checking the plant's accounting system's reliability, the plant's annual reports and all VAT receipts related to the CTC purchase, storage and transfer, and the accounting records of CR and CP-70 productions, transfers and sales in 2004.

- Visited CR production line and partially dismantled CP-70 production site, and took video and photos;

4.3 Conclusion

Table 4.3.1 CTC purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
37.41	338.25	230.64	0.00	145.02

* Including the amount of CTC stored in the plant warehouse and remaining in the workshop storages.

** Self uses in the plant for other applications.

Table 4.3.2 CR production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
55.53	477.22	448.18	0.00	84.57

* Self uses in the plant for other applications.

Table 4.3.3 CP-70 production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
28.92	535.78	425.91	0.00	138.78

* Self uses in the plant for other applications.

The number of 2004 operating days for CR and CP-70 productions is 215.58 and 242.12 days, respectively. The average CTC consumption ratio is 0.31 MT/MT for CR production and 0.15 MT/MT for CP-70 production over the year of 2004.

For further details, please see Annex I (File: Annex I_CR#4_Zhejiang Xin'an)[4].

4.4 Financial verification summary

The major reason for the discrepancies between financial verification and production verification is the time of recording.

For further details, please see Annex III, para. 95 to 102.

[4] Verification of CTC consumption for both chlorinated rubber and chlorinated paraffin-70 productions are reported in the same file under name of the plant.

CR#5: Jiangsu Fasten Fine Chemical Co., Ltd.

5.1 Enterprise background

Jiangsu Fasten Fine Chemical Co. Ltd. (Jiangsu Fasten) has one chlorinated rubber production line and one chlorinated paraffin-70 production line.

The chlorinated paraffin-70 production unit, based on CTC PA application, had been dismantled in 2001 and verified by the Bank's 2003 verification mission. Instead, a new CP-70 production line, based aqueous technology without using CTC, was installed in 2002 under normal production.

The chlorinated rubber production unit was constructed in October 1993 with annual capacity of 1,000 MT/a. The unit still uses CTC as a process agent for chlorinated production. Its 2004 CTC consumption quota received from SEPA is 730 MT ODS.

5.2 Verification

The verification team visited the plants on April 4, 2005 with accompanied by Feng Liulei (SEPA officer). Name of the director and his contact information is as below:

Mr. Kezhi Yao:	General Manager
Telephone:	0510-6112329
Fax:	0510-6114383
Address:	987 Nanwaihuan Road, Jiangyin, Jiangsu 214433, China

The following steps were taken to verify CTC consumption in 2004:

- Listened to the plant management's introduction on plant history, plant identification, and plant activities on CR production and CTC consumption in 2004;
- Verified CTC purchase from daily movement records of CTC transferred from outside to the plant warehouse;
- Verified CTC opening and closing stocks from monthly CTC inventory (including the amount of CTC stored in plant warehouse and remaining in workshop storages);
- Verified CTC consumption = CTC purchase + CTC opening stock – CTC closing stock;
- Verified CR production and sales from product daily packing records and product daily transfer records (from production line to warehouse and from warehouse to outside for sales);
- Verified CR opening and closing stocks from monthly product stock inventory;
- Verified number of operating days from daily production logs.
- Concurrently, conducted a financial verification in financial dept. by reviewing and checking the plant's accounting system's reliability, the plant's annual reports and

all VAT receipts related to the CTC purchase, storage and transfer, and the accounting records of CR production, transfer and sales in 2004.

- Visited CR production line and CTC storages in workshop, took video and photos;
- Visited raw material and CR, CTC warehouses, took video and photos;

5.3 Conclusion

Table 5.3.1 CTC purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
38.70	760.50	213.75	0.00	585.45

* Including the amount of CTC stored in the plant warehouse and remaining in the workshop storages.
** Self uses in the plant for other applications.

Table 5.3.2 CR production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
156.43	704.74	705.58	0.00	155.59

* Self uses in the plant for other applications.

The number of 2004 operating days is 335.00 days. The average CTC consumption ratio over the year 2004 is 0.30 MT CTC/MT CR.

For further details, please see Annex I (File: Annex I_CR#5_Jiangsu Fasten).

5.4 Financial verification summary

Financial verification has different results with production verification.

The difference of CR production between financial verification and production verification is due to the time difference of recording.

For further details, please see Annex III, Para. 126 to 133.

CR#6: Fujian Wantaixing Chemical Development Co., Ltd.

6.1 Enterprise background

Fujian Wantaixing Chemcal Development Co., Ltd. (Fujian Wantaixing) a dedicated chlorinated rubber producer established in 1998. The enterprise was owned by Hongkong investors. Its chlorinated rubber production unit was constructed in 1998 and commissioned in 1999. The annual capacity is 800 MT/a.

Different process technology was applied in the plant for manufacture of chlorinated rubber product, but CTC is still used and recycled as a process agent for chlorination reaction. The enterprise was newly identified in 2004 as a CTC-based chlorinated rubber producer and, therefore, no plant reference number was made in Sector Plan.

In 2004, the plant received 600 MT of CTC consumption quota from SEPA.

6.2 Verification

The verification team visited the plant on March 24-25, 2005 with accompanied by Li Yunpeng (SEPA officer). Name of the director and his contact information is as below:

Mr. Zhang Zhenliang:	General Manager
Telephone:	13505900191
Fax:	0595-5715351
Address:	Wuli High-Tech Industrial Park, Quanzhou, Fujian, China

The following steps were taken to verify CTC consumption in 2004:

- Listened to plant management's introduction on plant history, plant identification, and plant activities on CR production and CTC consumption in 2004;
- Verified CTC purchase from daily movement records of CTC transferred from outside to the plant warehouse;
- Verified CTC opening and closing stocks from monthly CTC inventory (including the amount of CTC stored in plant warehouse and remaining in workshop storages);
- Verified CTC consumption = CTC purchase + CTC opening stock – CTC closing stock;
- Verified CR production and sales from product daily packing records and product daily transfer records (from production line to warehouse and from warehouse to outside for sales);
- Verified CR opening and closing stocks from monthly product stock inventory;
- Verified number of operating days from daily production logs.
- Concurrently, a financial verification was conducted in financial department by reviewing and checking the plant's accounting system's reliability, the plant's annual reports and all VAT receipts related to the CTC purchase, storage and transfer, and the accounting records of CR production, transfer and sales in 2004.
- Visited CR production line and workshop CTC storages, took video and photos;
- Visited CTC and CR warehouses, took video and photos;

6.3 Conclusion

Table 6.3.1 CTC purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
22.00	388.00	328.61	0.00	81.39

* Including the amount of CTC stored in the plant warehouse and remaining in the workshop storages.
** Self uses in the plant for other applications.

Table 6.3.2 CR production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
10.00	800.25	796.00	0.00	14.25

* Self uses in the plant for other applications.

The number of 2004 operating days is 251.58 days. The average CTC consumption ratio in 2004 is 0.41 MT/MT.

For further details, please see Annex I (File: Annex I_CR#6_Fujian Wantaixing).

6.4 Financial verification summary

There are no any discrepancies between financial verification and production verification.

For further details, please see Annex III, Para. 72 to 83.

CHLORINATED PARAFFIN-70 PRODUCTIONS

CP#4: Zhejiang Xin'an Chemical and Industrial Co., Ltd.

(Same as CR#4)

CP#18: Shenyang Chemical Co., Ltd.

18.1 Enterprise background

Shenyang Chemical Co. Ltd. is a state-owned shares company established in 1997 (changed from former Shenyang Chemical Plant founded in 1938). Its chlorinated paraffin-70 production unit was installed in 1983 with annual capacity of 500 tons per year. In 1990, with expansion, the unit reached a capacity of 1,500 MT/a.

Raw materials used in the plant are chlorinated paraffin-40 and chlorine with CTC as a process agent recycled in the process. Its CTC consumption quota is 40 MT ODS.

The enterprise signed contract with SEPA to close the CTC-based chlorinated paraffin-70 production unit by end of 2004. To comply with the contract, also due to the market reason and application of aqueous technology, the CTC-based CP-70 unit was stopped production in March and dismantled in October 2004.

Instead of the closure, a new production line of CP-70 based on aqueous technology (without using CTC) was installed in the plant and commissioned in April 2004.

18.2 Verification

The verification team visited the plant on March 17, 2005 with accompanied by Gong Xingming (SEPA officer). Name of the director and its contact information are as follow:

Ms. Wu Juan:	Director of Chief Engineer Office
Telephone:	024-25553362
Fax:	024-25827733
Address:	46 Weigong St., Tiexi District, Shenyang, Liaoning 110026, China

The following steps were taken to verify CTC consumption and CP-70 unit closure:

- Listened to the plant management's introduction on plant history, plant identification, and plant activities in 2004;
- Checked all documentation related to the plant closure activities in 2004;
- Verified CTC purchase from daily movement records of CTC transferred from outside to the plant warehouse;

- Verified CTC opening and closing stocks from monthly CTC inventories (including the amount of CTC stored in plant warehouse and remaining in workshop storages);
- Verified CTC consumption = CTC purchase + CTC opening stock – CTC closing stock;
- Verified CP-70 production and sales from product daily packing records and product daily transfer records (from production line to warehouse and from warehouse to outside for sales);
- Verified CP-70 opening and closing stocks from monthly product stock inventory;
- Verified number of operating days from daily production logs.
- Concurrently, a financial verification was conducted by reviewing and checking the plant's accounting system's reliability, the plant's annual report and all VAT receipts related to the CTC purchase, storage and transfer, and the accounting records of CP-70 production, transfer and sales in 2004.
- Visited CP-70 production unit dismantling site, and took video and photos;

18.3 Conclusion

Table 18.3.1 CTC purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
29.69	1.25	8.49	22.45	0.00

* Including the amount of CTC stored in the plant warehouse and remaining in the workshop storages.

** 1.25 MT CTC used for NCl3 removal from liquid chlorine production, 16.48 MT CTC sold to licensed CTC user (Dalian Luyuan New Chemical Medical Co., Ltd.), and 4.72 MT CTC may contribute to reading errors in taking storage levels, emitted to air, or occupied by water content brought by process-recycled CTC.

Table 18.3.2 CP-70 production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
245.20	124.74	275.65	0.00	94.29

** . Self uses in the plant for other applications.

The number of operating days in 2004 is 30 days. The average CTC consumption ratio over the period is 0.07 MT CTC/MT CP-70.

The mission visitors' physical inspection on site of the dismantled production unit shows that the plant has dismantled its CTC-based chlorinated paraffin-70 production unit as required by contract signed with SEPA.

However, the mission identified that, under 2004 CTC consumption quota issued for organizing the chlorinated rubber production, the company used 1.25 tons of CTC as a process agent in another application for removing NCl3 from the liquid chlorine production in synthesis plant. The mission visitors inspected the application site, and took video and

photos. Such application was listed by Decision X/14 as No.1 of the 25 PA applications[5] and should be covered by the current Sector Plan (Phase I).

For details, please see Annex I (File: Annex I_CP#18_Shenyang Chemical) and Annex II, Page 2 to 4.

18.4 Financial verification summary

Financial verification has different results with production verification.

The opening stock of CTC verified by production verification included the physical stock in production plant which was treated as consumption in 2003 by financial verification. The consumption of CTC verified by production verification was CTC added into the process while financial verification treated CTC delivered to production plant as consumption. The quantity of CTC sold to other CTC user was already treated as consumption financially.

For further details, please see Annex III, para. 21 to 33.

CP#21: Longchang Shenghua Chemical Plant

21.1 Enterprise background

Longchang Shenghua Chemical Plant (Longchang Shenghua) was established in 1995 with main products including CP-70 and CP-52. The chlorinated paraffin-70 production line was constructed in 1995 and completed in 1996 with annual capacity of 1,000 tons. Its 2004 CTC consumption quota is 90 MT ODS.

The plant signed closure contract with SEPA on November 8, 2003, stopped chlorinated paraffin-70 production in May 2004, and dismantled the CTC-based CP-70 production unit on May 21, 2004.

After dismantling, the plant was moved to a new location 300 meters away from the old location, and established a new chlorinated paraffin-70 production line using aqueous technology instead of CTC with annual capacity of 2,000 tons per year.

21.2 Verification

The verification team visited the plant on April 9, 2005 with accompanied by Gong Xingming (SEPA officer). Director and its contact information are as follow:

Mr. Wu Yungao:	General Manager
Telephone:	0832-3897020, 3897028

[5] See Decision X/14 that was approved by the Parties 10th Meeting.

Fax: 0832-3897028
Address: Baishuitan, Longchang County, Sichuan 642105, China

Due to the plant moving and CTC-based chlorinated paraffin-70 production unit dismantling, the plant did not provide complete original documents for the mission review. The mission visitors took the following steps to verify CTC consumption and plant closure activities in 2004:

- Listened to the plant management's introduction on plant history, plant identification, and plant activities in 2004;
- Checked contract and documents related to the plant closures in 2004;
- Visited old plant dismantling site, new CP-70 production line, and drums of CTC residue discharged from the unit dismantling, and took video and photos;
- Verified CTC purchase from monthly records of CTC transferred from outside to the plant warehouse;
- Verified CTC opening and closing stocks from monthly CTC inventory in plant warehouse;
- CTC consumption = CTC purchase + CTC opening stock – CTC closing stock;
- Verified CP-70 production from daily product packing and transfer records (from production line to plant warehouse);
- Verified CP-70 opening and closing stocks from monthly stock inventory;
- Concurrently, a financial verification was conducted by checking the plant's accounting system reliability, all VAT receipts related to CTC purchase, and all available financial records on CP-70 production and sales in 2004.

21.3 Conclusion

Table 21.3.1 CTC purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
6.51	15.01	19.22	0.00	2.30***

* Including the amount of CTC stored in the plant warehouse and remaining in the process storages.

** Self uses in the plant for other applications.

*** CTC residue discharged from the CP-70 production unit dismantling, still stored in drums remaining in the plant.

Table 21.3.2 CP-70 production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
37.15	314.16	295.75	0.00	0.00

* Self uses in the plant for other applications.

The number of operating days in 2004 is unknown as all production logs were lost. The average CTC consumption ratio in 2004 is 0.06 MT CTC/MT CP-70.

The mission visitors' physical inspection shows that the plant has fully dismantled its chlorinated paraffin-70 production line. However, 2.3 tons of CTC residue (7 and half drums) still remains in the plant for proper disposal.

For further details, please see Annex I (File: Annex I_CP#21_Longchang Shenghua) and Annex II, Page 5 to 7.

21.4 Financial verification summary

Financial verification has different results with production verification.

The accountant of Longchang Shenghua is a part-time staff of Longchang Shenghua. The accountant could not record all CTC-based CP-70 products made by Longchang Shenghua. This caused the difference of CTC-based CP-70 between financial verification and production verification.

For further details, please see Annex III, Para. 146 to 155.

CP#22: Chongqing Tiansheng Chemical Co., Ltd.

22.1 Enterprise background

Chongqing Tiansheng Chemical Co., Lt. (Chongqing Tiansheng) was established in 1984. Chlorinated paraffin-70 production unit was installed in 1989 with annual capacity of 100 MT/a, and then expanded to 500 MT/a in 1992.

The enterprise also produce CTC and carbon hexachloride as final products by distilling CTC residues collected from other dedicated CTC producers. Both the CP-70 production unit and the CTC distillation unit are located in the same workshop building. Two reactors in CP-70 unit are jointly used by carbon hexachloride distillation.

Due to the market reason and production cost, the CP-70 unit was stopped production in October 2000 and did not resume until it was dismantled in December 2003.

Location of the plant is next to Chongqing Tianyuan Chemical General Plant. Due to the April 16, 2004 explosion in Chongqinag Tianyuan, the World Bank's April 2004 mission to verify the plant's CP-70 closure was cancelled.

22.2 Verification

The mission visited the enterprise on April 8, 2005 with accompanied by Gong Xingming (SEPA officer). Director and its contact information are as follow:

Mr. Tang Kecheng:	General Manager
Telephone Number:	023-67771747
Fax Number:	023-67771793
Address:	34 Jianxin Xilu, Jiangbei District, Chongqing 400022, China

Following steps were taken to verify the CP-70 production closure in this plant:

- Listened to the plant management's introduction on plant history, plant identification, its CP-70 production and closure activities in 2003;
- Checked the contract signed with SEPA and all closure documentation;
- Checked and questioned CP-70 production and financial records (2000-2004), labor compensation, and raw material and final product (chlorinated paraffin-70) stocks.
- Visited original dismantling site of chlorinated paraffin-70 unit, and took video and photos;

22.3 Conclusion

The mission visitors' physical inspection shows that the plant has dismantled its chlorinated paraffin-70 production unit and it is unable to resume production.

Key equipment was destroyed and sold to Chongqing City Fuchuan Metal-Recovery Co., Ltd., including two chlorination reactors, one neutralization kettle, one distillation kettle, and one CTC storage tank.

Documents were well prepared and made to SEPA as required by the closure contract.

No CTC residue and raw material or final product stocks are identified during the visit.

Two jointly-use reactors are still there used for carbon hexachloride distillation.

For further details, please see Annex II (Page 8 to 10) and Annex III (Para. 142 to 145).

CP#24: Dalian JX Chemical-Industrial Co., Ltd.

24.1 Enterprise background

Dalian JX Chem-Industrial Co. Ltd. (Dalian Jiangxi) had four chlorinated paraffin-70 production units with total capacity of 3,000 MT/a.

The first unit started construction in 1985 and commissioned in 1986 with annual capacity of 500 MT/a. The second was installed in 1990 (500 MT/a) and the other two installed in

1993 and 1996 respectively with 1,000 MT/a capacity for each unit. Most CP-70 produced in the plant was exported. Its 2004 CTC consumption quota is 270 MT ODS of.

To comply with the contract signed with SEPA, the enterprise stopped CP-70 production in October and dismantled the unit in December 2004. Concurrently, a new CP-70 production line based on thermal chlorination technology (without using CTC) was constructed and put into production in 2004 with annual capacity of 1,000 tons.

24.2 Verification

The verification team visited the plant on March 19-20, 2005 with accompanied by Gong Xingming (SEPA officer). Name of the director and its contact information are as follow:

Mr. Wang Xianfa:	Vice General Manager
Telephone:	0411-86220303
Fax:	0411-86220306
Address:	Jiangxi Town, Dalian City, Liaoning 116046, China

The mission took following steps to verify CTC consumption and CP-70 unit closure:

- Listened to the plant management's introduction on plant history, plant identification, and plant activities in 2004;
- Checked all documents related to the plant closure activities in 2004;
- Visited CP-70 production unit dismantling site, and took video and photos;
- Verified CTC purchase from daily movement records of CTC transferred from outside to the plant warehouse;
- Verified CTC opening and closing stocks from monthly CTC inventories (including the amount of CTC stored in plant warehouse and remaining in workshop storages);
- Verified CTC consumption = CTC purchase + CTC opening stock – CTC closing stock;
- Verified CP-70 production and sales from daily packing records and product transfer records (from production line to warehouse and from warehouse to outside);
- Verified CP-70 opening and closing stocks from monthly product stock inventory;
- Verified number of operating days from daily production logs.
- Concurrently, financial verification was conducted by reviewing and checking the plant's accounting system's reliability, the plant's annual report, all VAT receipts and accounting records related to CTC purchase, storage, transfer, and CP-70 production, transfer and sales in 2004.

24.3 Conclusion

Table 24.3.1 CTC purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
13.45	197.16	205.03	0.00	5.58

* Only the amount of CTC stored in the plant warehouse. The plant did not account the amount of CTC that remained in the production unit.

Table 24.3.2 CP-70 production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
116.17	2,234.79	2,333.43	1.40	16.13

** Sent to clients as product samples.

The number of operating days in 2004 is 223.89 days. The average CTC consumption ratio over the period is 0.09 MT CTC/MT CP-70.

The mission visitors' physical inspection shows that the plant has dismantled its chlorinated paraffin-70 production unit as required by contract signed with SEPA.

For details, please see Annex I (File: Annex I_CP#24_Dalian Jiangxi) and Annex II, Page 11 to 13.

24.4 Financial verification summary

Financial verification has different results with production verification.

Red opening stock of CTC by financial verification implicated that some purchases of CTC in 2003 were not treated as purchases since the VAT invoices were not received by DLJCHEM, but physical CTC were still delivered to CP-70 production plant. The financial purchase of CTC in 2004 included the quantity of CTC (54.039 MT) purchased in 2003 but the VAT invoices were issued in 2004. The quantity of CTC consumption was a roughly figure not exactly. This resulted too in 0.8 MT difference of closing stock between financial verification and production verification.

The opening stock of CTC by production verification included the CTC stock in CP-70 production plant. The consumption of CTC was real consumption.

For further details, please see Annex III, Para. 38 to 50.

CP#71: Huanghua Jinhua Chemical Co., Ltd.

71.1 Enterprise background

Huanghua Jinhua Chemical Co. Ltd. (based on Hebei Huanghua Chemical Plant) was established in 1970. Its major products include caustic soda, liquid chlorine, hydrochloric acid, and chlorinated paraffin-70.

The company has three CP-70 production units with a total capacity of 3,000 tons per year. The first (1,000 MT /a) was installed in 1990 and commissioned in 1991. The other two were constructed in 1999 with each capacity of 1,000 MT/a. However, in 2004, only two CP-70 units were organized in production. Its 2004 CTC consumption quota is 40 MT ODS.

The enterprise signed contract with SEPA to close the chlorinated paraffin-70 production units by end of 2004. To comply with the contract, the plant stopped CP-70 production in October and completed the dismantlement in November 2004.

71.2 Verification

The verification team visited the plant on March 21-22, 2005 with accompanied by Li Yunpeng (SEPA officer). Directors and their contact information are as follow:

Mr. Luo Jincheng:	General Manager
Mr. Zhang Lianqing:	Vice General Manager
Telephone:	0317-5221334
Fax:	0317-5223370
Address:	Beihuan Road, Huanghua City, Hebei 061100, China

The following steps were taken to verify CTC consumption and CP-70 plant closures:

- Listened to the plant management's introduction on plant history, plant identification, and plant activities in 2004;
- Checked all documentation related to the plant closure activities in 2004;
- Verified CTC purchase from daily movement records of CTC transferred from outside to the plant warehouse;
- Verified CTC opening and closing stocks from monthly CTC inventory in plant warehouse;
- Verified CTC consumption = CTC purchase + CTC opening stock – CTC closing stock;
- Verified CP-70 production and sales from product daily packing records and product daily transfer records (from production line to warehouse and from warehouse to outside for sales);
- Verified CP-70 opening and closing stocks from monthly product stock inventory;

- Verified number of operating days from daily production logs.
- Concurrently, conducted a financial verification by reviewing and checking the plant's accounting system's reliability, the plant's annual report and all VAT receipts related to the CTC purchase, storage and transfer, and the accounting records of CP-70 production, transfer and sales in 2004.
- Visited CP-70 production unit dismantling site, and took video and photos;

71.3 Conclusion

Table 71.3.1 CTC purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
17.25	12.00	29.25	0.00	0.00***

* Not include the amount of CTC remaining in the process storages; the plant did not account it.

** Self uses in the plant for other applications.

*** One drum of CTC residue (about 250 kg) discharged from process storages still remained in the plant.

Table 71.3.2 CP-70 production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
254.10	237.80	294.73	0.00	197.18

* Self uses in the plant for other applications.

The number of 2004 operating days is 104.01 days. The average CTC consumption ratio in 2004 is 0.12 MT CTC/MT CP-70.

The mission visitors' physical inspection on dismantled chlorinated paraffin-70 production site shows that the plant has fully dismantled its three CP-70 units. However, one drum of CTC residue (about 250 kg) discharged from the dismantling still remained in the plant warehouse to be properly treated.

For further details, please see Annex I (File: Annex I_CP#71_Huanghua Jinhua) and Annex II, Page 14 to 16.

71.4 Financial verification summary

There are no any discrepancies between financial verification and production verification.

For further details, please see Annex III, Para. 51 to 60.

CSM PRODUCTION

CSM#51: Jilin Chemical Industrial Co., Ltd.

51.1 Enterprise background

Jilin Chemical Industrial Co. Ltd. (JCIC) was established in the 1950s. Three CSM production lines were installed in CCF plant (Calcium Carbide Factory of JCIC) and their production are also organized by the CCF plant.

The first CSM line was constructed and commissioned in 1970 with annual capacity of 1,000 tons. The second CSM line was installed in 1989 with annual capacity of 2,000 tons. Both the lines consume CTC as a process agent at a high level[6].

To reduce CTC consumptions by emission control (as required by Sector Plan), the enterprise constructed a new CSM production line in 2004 to replace the two old lines with same capacity of 3,000 MT/a. The new line was put into trial production in December 2004.

When the mission visited the enterprise, the old CSM line (1,000 MT/a) had been stopped production and sealed up in June 2004[7], while the second CSM line (2,000 MT/s) and the new CSM line (3,000 MT/a) were in joint operations for CSM production[8].

In 2004, the enterprise received a total of 1708 MT CTC consumption quota from SEPA for both CSM production and new CSM line commission.

51.2 Verification

The verification team visited the plant on March 15-16, 2005 with accompanied by Yang Lirong (SEPA officer). Name of the directors and their contact information are as follow:

Mr. Jin Guangri,	Vice Director of CCF plant, JCIC
Mr. Li Xueming,	Vice Director of Technical Department
Telephone:	0432-3989641, 3983374
Fax:	0432-3983957
Address:	11 Zhenzhou Road, Longtan District, Jilin City, Jilin 132022, China

The following steps were taken to verify CTC consumption in 2004:

- Listened to the plant managements' introduction on plant history, plant identification, and plant activities on CSM production, CTC consumption, and new line construction and trial production in 2004;

[6] The average consumption ratio of CTC from 2001 (baseline year) to 2003 was 0.35-0.37 MT/MT
[7] Equipment of the old line (1,000 MT/a) was partially dismantled.
[8] CSM reactants discharged from the reactors of the new line are all transferred directly by pipeline to the second line for separating, drying and packaging operations to get the final products.

- Verified CTC purchase from daily movement records of CTC transferred from outside to plant warehouse;
- Verified CTC opening and closing stocks from monthly CTC inventory (including the plant warehouse and the CSM production storages);
- Verified CTC consumption = CTC purchase + CTC opening stock – CTC closing stock;
- Verified CSM production and sales from daily packing records and transfer records (from production line to warehouse and from warehouse to outside for sales);
- Verified CSM opening and closing stocks from monthly product stock inventory;
- Verified number of operating days from daily production logs.
- Concurrently, conducted a financial verification by reviewing and checking the company's accounting system's reliability, the company's annual reports, and all VAT receipts and accounting records related to the CTC purchase, storage, transfer and the CSM production, transfer and sales in 2004.
- Visited CSM production lines and CSM production sites (both new and old), and the sealed up CSM workshop (partially dismantled line), and took video and photos;
- Visited CSM product warehouse and CTC storages, and took video and photos;

51.3 Conclusion

Table 51.3.1 CTC purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption**	Other uses***	Closing stock*
546.59	1,343.57	1,649.73	3.25	237.18

* Including the amount of CTC stored in plant warehouse and remaining in CSM process storages.
** 856.32 MT used in new CSM line for putting the system in trial production.
*** Self uses in the company for cleaning purposes: 0.5 MT used in Fertilizer Plant; 2.75 MT used in Ethanediol Plant.

Table 51.3.2 CSM production, sales and stocks (in MT)

Opening stock	Production	Sales	Other uses*	Closing stock
293.58	2,173.60	2,409.93	0.00	57.25

* Self uses in the plant for other applications.

The number of 2004 operating days is 322.96 days. The average CTC consumption ratio over the year 2004 is 0.76 MT/MT[9].

The mission visit identified that, in 2004, Jilin Chemical Industrial Co. Ltd. consumed 3.25 MT CTC for cleaning purposes in fertilizer plant and ethanediol plant. Such applications should be strictly banned.

[9] Including the amount of 856.32 MT CTC consumed in new line for putting the system into trial production.

For further details, please see Annex I (File: Annex I_CSM#51_Jilin Chemical).

51.4 Financial verification summary

Financial verification has different results with production verification.

The opening stock of CTC verified by production verification included the physical stock in production plant which was treated as consumption in 2003 by financial verification. The consumption of CTC verified by production verification included the stock in production plant while it was already consumed financially. By the end of 2004, there was no any physical stock in production plant, so the closing stocks are the same

For further details, please see Annex III, Para. 9 to 20.

KETOTIFEN PRODUCTION

KT#59: Zhejiang Huahai Pharmaceutical Co., Ltd.

59.1 Enterprise background

Zhejiang Huahai Pharmaceutical Co. Ltd. (Zhejiang Huahai) is a shares company established in 2001. Its ketotifen production line was installed in 1990 from a pilot-scale with annual capacity of 100 kg, and then enlarged in 1992 to commercial scale with annual capacity of 3 tons. CTC is used in the process as PA.

In July 2003, the enterprise dismantled CTC-related equipment, converted the ketotifen line to a non-ODS process, and stopped using CTC. However, no contract is signed between Zhejiang Huahai and SEPA on the CTC phase out project in PA Sector (Phase I).

In 2004, no CTC consumption quota was issued to this plant.

59.2 Verification

The mission visited the enterprise on March 31, 2005 with accompanied by Li Yunpeng (SEPA officer). The director and his contact information are as follow:

Mr. Zhou Minghua:	General Manager
Telephone Number:	0576-5991518
Fax Number:	0576-5016013
Address:	Xungqiao, Linghai City, Zhejiang 317024, China

Following steps were taken to verify the ketotifen production line conversion in this plant:

- Listened to Mr. Zhou's introduction on plant history, plant identification, ketotifen production (2003, 2004), and CTC-based line closure (process conversion) activities;
- Questioned equipment dismantling issue and checked dismantled equipment list.
- Questioned 4.2 tons CTC (closing stock of 2003) issue and checked VAT receipt;
- Reviewed Zhejiang Huahai ketotifen process conversion report and its cost-claiming report (ZHY[2004]#39, submitted to SEPA in May 2004);
- Visited ketotifen production line and equipment dismantling site, and took video and photos.
- Visited plant's equipment outdoor warehouse, and took video and photos.

59.3 Conclusion

The mission visitors' physical inspection shows that the plant has converted its ketotifen production line to a non-ODS process and stop using CTC.

Two reactors dismantled from CTC-based ketotifen line are discarded in plant's equipment outdoor warehouse, but not destroyed.

4.2 tons of CTC (closing stock of 2003) was sold to Linghai City Huanan Chemical Co., Ltd. (licensed CTC consumer: #CTCCL2004-04) on December 24, 2003.

No CTC remain is identified during the mission visit.

For further details, please see Annex II (Page 29 to 31) and Annex III (Para. 103 to 105).

ENDOSULPHAN PRODUCTION

ES#1: Jiangsu Anbang Group Corporation

ES1.1 Enterprise background

Jiangsu Anbang Group Corporation (Jiangsu Anbang) was established in 1958. The enterprise has two endosulphan production lines with total capacity of 1,400 MT/a.

The first old line was constructed in 1997 and commissioned in 1998 with annual capacity of 400 tons, and the second new line was installed in 2000 with annual capacity of 1,000 tons. Both the lines use hexa-chlor-cyclo-pentadiene (HCCP) and butendiol as raw materials and CTC as a process agent for endosulphan production.

The enterprise stopped endosulphan production with old line in December 1999 and new line in July 2003. A closure contract was signed with SEAP to close both the endosulphan production units by end of 2004.

When the verification team visited Jiangsu Anbang, the enterprise already dismantled its 1,000 tons endosulphan production line in September 2004. For the 400 tons endosulphan production line, equipment was partially dismantled.

ES1.2 Verification

The mission visited the enterprise on April 6, 2005 with accompanied by Feng Liulei (SEPA officer). The director and his contact information is as follow:

Ms. Wang Haifeng:	Director of Safety and Envir. Department
Telephone Number:	0517-3556119
Fax Number:	0517-3631984
Address:	30 Huagong Road, Huai'an City, Jiangsu 223002, China

Following steps were taken to verify the endosulphan production closures in this plant:

- Listened to plant management's introduction on plant history, plant identification, its endosulphan production and endosulphan unit closure activities in 2003-2004;
- Checked contract signed with SEPA and documentation related to the endosulphan production line closure activities;
- Checked original production records and financial records concerning endosulphan production activities , raw material consumption and stocks, and CTC purchase, transfer and stocks for mission' review;
- Questioned CTC residue and product intermedia treatments.
- Visited the endosulphan production dismantling sites, and took video and photos.
- Visited plant warehouse of CTC and endosulphan, and took video and photos.

ES1.3 Conclusion

The mission visitors' physical inspection shows that the plant has dismantled its 1,000 tons endosulphan production line, and partially dismantled its 400 tons production line.

Key equipment (2 reactors, 2 CTC condensers and 2 CTC storage tanks) of the 1,000 tons endosulphan line was destroyed and sold to local waste recovery company.

Documentation for 1,000 tons line closure was well prepared and made to SEPA as required by the contract. No CTC residue or final product stocks are identified during the mission visit.

For further details, please see Annex II (Page 23 to 25) and Annex III (Para. 138 to 141).

ES#2: Jiangsu Liyang Guanghua Chemical Co., Ltd.

ES2.1 Enterprise background

Jiangsu Liyang Guanghua Chemical Co. Ltd. (Jiangsu Liyang) is a pesticide manufacturer based on former Liyang Guanghua Middle School Plant. Its endosulphan production unit was commissioned in 1998 with annual capacity of 300 MT/a, and stopped production in December 2003.

Raw materials used for manufacturing endosulphan are hexa-chlor-cyclo-pentadiene (HCCP) and butendiol, while CTC is a process agent recycling in the process to facilitate the reaction.

According to Mr. Guang, the enterprise had converted its endosulphan production unit into a non-ODS process without using CTC at the end of 2003. And therefore, during the year of 2004, no CTC was consumed in endosulphan production.

When the mission visited Jiangsu Liyang, the enterprise already dismantled its endosulphan production unit in January 2005, and the plant area became empty with no worker, no office staff, and no production.

The mission was advised that the whole plant (Jiangsu Liyang) had been moved to a new address located in Binghai County Chemical Industrial Zone, about 400 km away from the current location, and the plant name was also changed.

ES2.2 Verification

The mission visited the enterprise on April 5, 2005 with accompanied by Feng Liulei (SEPA officer). The director and his contact information are as follow:

Mr. Guang Huaqing:	General Manager
Telephone Number:	
Address:	Niucheduo, Liyang County, Jiangsu 213300, China

Following steps were taken to verify the endosulphan production closure in this plant:

- Listened to Mr. Guang's introduction on plant history, plant identification, its endosulphan production and its endosulphan unit closure activities;
- Checked contract signed with SEPA and documentation related to the endosulphan production line closure activities;
- Asked for original production records and financial records concerning endosulphan production, raw material consumption and stocks, and CTC purchase, transfer and stocks for mission' review;

- Questioned CTC residue and product intermedia treatments.
- Visited the dismantled endosulphan production site, and took video and photos.

ES2.3 Conclusion

The mission visitors' physical inspection shows that the plant has dismantled its endosulphan production line and it is unable to resume production.

Key equipment was destroyed and sold to local waste recovery company.

Documents are not satisfied with requirements of the closure contract signed with SEPA.

No original production records or financial records provided for the mission's review.

No CTC residue or raw material or final product stocks are identified during the visit.

For further details, please see Annex II (Page 26 to 28) and Annex III, Para. 134 to 137.

PTFE PRODUCTION

PTFE#56: Shanghai 3F New Material Co., Ltd.

56.1 Enterprise background

Shanghai 3F New Material Co. Ltd. (Shanghai 3F) is a shares company established in 1992 with major products of fluoropolymers, fluoroelastomers, and fluorine compounds including polytetrafluoroethylene (PTFE), hexafluoropropylene (HFP), perfluorinated ethylene-propylene copolymer (F46), and fluorosilicone elastomer, etc.

Raw material used in manufacture of these products is R22. Under high temperature, R22 is transformed to TFE (tetrafluoroethylene, an intermedia product) first, and then sent to different production lines to further produce different fluorochemical products. In Shanghai 3F, more than 50 different kinds of such products are produced.

CFC-13 used as a process agent only involves in TFE production for recovering TFE monomer from tail gases. Shanghai 3F has two TFE production lines. One is in Plant No.2 with annual capacity of 1,500 MT/a, and the other is in Fluorochemical Plant[10] with annual capacity of 5,000 MT/a.

All TFE produced from Fluorochemical Plant is dedicated for PTFE production, while TFE

[10] Transferred from its former plant: Shanghai Tianyuan Group Company Fluorochemical Plant, Sector Plan #166.

produced in Plant No.2 is sent for each different application for manufacturing PTFE, F46, HFP, and other fluorochemical products.

Taking account of CFC-113 consumption nature and Shanghai 3F production features, the mission visit focuses on TFE production rather than PTFE.

At the beginning of year 2004, the company received 7 MT of CFC-113 consumption quotas from SEPA.

In October 2004, the company stopped using CFC-113 and converted both TFE production lines into a non-ODS process.

56.2 Verification

The verification team visited Shanghai 3F on April 1, 2005 with accompanied by Wang Kaixiang (SEPA officer). Name of the director and its contact information are as follow:

Ms. Su Xiaoli,	Vice General Manager
Telephone:	021-64340154
Fax:	021-64344702
Address:	4411 Longwu Road, Minghang District, Shanghai 200241, China

The mission took the following steps to verify CFC-113 consumption in 2004:

- Listened to the plant management's introduction on Shanghai 3F history and its CFC-113 consumption, TFE production, and plant activities in 2004;
- Verified CFC-113 purchase from daily records of CFC-113 transferred from outside to warehouses for both plants;
- Verified CFC-113 consumption from daily records of CFC-113 transferred from warehouses to process storages for both plants;
- Verified CFC-113 opening and closing stocks by: CFC-113 closing stock = CFC-113 purchase + CFC-113 opening stock - CFC-113 consumption;
- Verified TFE consumption from Plant. No.2 daily transfer records of TFE sent from production line to different applications in Workshop No.1, Workshop No.2, Workshop No.3, and Technical Center of the company;
- Verified TFE sales in Plant No.2 from production line to outside;
- Verified TFE production in Plant No.2 from daily production records;
- Verified TFE stocks in Plant No.2 by: TFE closing stock = TFE production + TFE opening stock – TFE consumption – TFE sales – TFE other uses in the plant;
- Verified TFE production, consumption and stocks in Fluorochemical Plant from its daily production records, daily transfer records and TFE stock inventories;
- Verified number of operating days from daily production logs for both plants;

- Concurrently, conducted financial verification by reviewing and checking the plant's accounting system's reliability, the plant's annual report, the VAT receipts and accounting records related to CFC-113 purchase, storage, transfer, and TFE production, transfer and sales in 2004.
- Visited both TFE production lines and TFE recovery systems where CFC-113 was used as PA, and took video and photos.

56.3 Conclusion

Table 56.3.1 CFC-113 purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
0.00	7.00	7.00	0.00	0.00

* The amount of CFC-113 in plant warehouses.
** Self uses in the plant for other applications.

Table 56.3.2 TFE production, consumption, sales and stocks: Plant No.2 (in MT)

Opening stock	Production	Consumption*	Sales	Other uses**	Closing stock
8.05	1,698.74	1,662.67	36.38	2.21	5.52

* Sent to different production lines for manufacturing different final products (PTFE, F46, etc.).
** Sent to Technical Center for lab test and research purposes.

Table 56.3.3 TFE production, consumption and stocks: Fluorochemical Plant (in MT)

Opening stock	Production	Consumption*	Other uses**	Closing stock
2.45	5,325.68	5,326.15	0.00	1.98

* Sent for PTFE production.
** Self uses in the plant for other applications.

The number of operating days for Plant No.2 and Fluorochemical Plant in 2004 is 339.72 days and 326.12 days, respectively. The average CCF-113 consumption ratio is 0.74 kg/MT TFE for Plant No. 2 and 1.08 kg/MT TFE for Fluorochemical Plant in 2004.

The mission visitors' physical inspection on TFE production sites shows that Shanghai 3F has converted its two TFE production lines into a non-ODS process, but the CFC-113 based facilities remains there; it is possible to reconvert the process back to use CFC-113 PA.

For further details, please see Annex I (File: Annex I_PTFE#56_Shanghai 3F).

56.4 Financial verification summary

There are no any discrepancies between financial verification and production verification.

For further details, please see Annex III, Para. 106 to 111.

PTFE#57: Chenguang Chemical Research Institute

57.1 Enterprise background

Chenguang Chemical Research Institute (Chenguang Chemical) was established in 1965. The enterprises have two tetrafluoroethylene (TFE) production lines.

The first line, using CFC-113 as a process agent, was installed in 1969 with annual capacity of 60 tons. After its expansions in 1989, 1996 and 1999, the annual capacity reached to 3,000 MT/a. All produced TFE is used for manufacturing polytetrafluoroethylene (PTFE).

The second line was constructed and commissioned in August 2003 with annual capacity of 2,500 MT/a. The new line adopted non-ODS technology instead of the use of CFC-113. All produced TFE is sent for PTFE, hexafluoropropylene (HFP) and tetrafluoropropanol (TFP) production.

As CFC-13 was used in the plant for old line TFE production only, and the total amount of TFE consumed in PTFE production was partially supplied by the new TFE line based on non-ODS technology, the verification is focused on the old line TFE production only.

In 2004, total amount of CFC-113 consumption quota the enterprise received from SEPA was 3.5 MT ODS.

57.2 Verification

The mission visited Chenguang Chemical on April 10, 2005 with accompanied by Gong Xingming (SEPA officer). Name of the director and its contact information are as follow:

Mr. Li Jia,	President Assistant of Institute
Telephone:	0813-7202180 ext. 2027, 2125, 2032 and 0813-7206189
Fax:	0813-7201124
Address:	139 Chenguang Road, Fushun, Zigong City, Sichuan 643201, China

The mission visit took the following steps to verify CFC-113 consumption in 2004:

- Listened to the plant management's introduction on Chenguang Chemical's history and its CFC-113 consumption, TFE production, and plant activities in 2004;
- Verified CFC-113 purchase from daily records of CFC-113 transferred from outside to plant warehouses;
- Verified CFC-113 opening and closing stocks from monthly CFC-113 inventories, including the amount of CFC-113 stored in the plant warehouse and the amount of CFC-113 remaining in the production storages.
- Verified CFC-113 consumption = CFC-113 purchase + CFC-113 opening stock - CFC-113 closing stock;

- Verified TFE production from daily transfer records of TFE from TFE production line to PTFE production line;
- Verified TFE consumption = TFE production (All TFE sent to PTFE production line was consumed without stocks);
- Verified number of operating days from daily production logs;
- Concurrently, a financial verification was conducted by reviewing and checking the plant's accounting system's reliability, the plant's annual report, and its accounting records related to CFC-113 purchase, storage, transfer, and TFE production in 2004.

57.3 Conclusion

Table 57.3.1 CFC-113 purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
1.61	0.00	0.49	0.00	1.12

* Including the amount of CFC-113 in plant warehouse and in TFE production storages.
** Self uses in the plant for other applications.

Table 57.3.2 TFE production, consumption and stocks in 2004 (in MT)

Opening stock	Production	Consumption*	Other uses**	Closing stock
0.00	1,390.00	1,390.00	0.00	0.00

* All sent for PTFE production.
** Self uses in the plant for other applications.

The number of operating days in 2004 is 204.63 days. The average CFC-113 consumption ratio in 2004 is 0.35 kg/MT TFE.

For further details, please see Annex I (File: Annex I_PTFE#57_Chenguang Chemical).

57.4 Financial verification summary

Financial verification has different results with production verification.

The opening stock of CFC-113 by production verification included the inventory in production plant and the consumption was the quantity of CFC-113 physically consumed while the opening stock of CFC-113 by financial verification was the inventory in warehouse and the consumption of CFC-113 referred to the quantity of CFC-113 delivered to production plant.

For further details, please see Annex III, Para. 156 to 161.

PTFE#167: Jinan 3F Fluoro-Chemical Co., Ltd.

167.1 Enterprise background

Jinan 3F Fluoro-Chemical Co. Ltd. (Jinan 3F) was established in 1954, based on its former company Jinan Chemical Plant.

The plant has one TFE production line using CFC-113 as a process agent for recovering TFE monomer from tail gases. The line was constructed in 1966 with annual capacity of 1,200 tons, and then expanded to 1,500 MT/a in 1999 and 3,000 MT/a in 2003.

Most of the produced TFE is used in the plant for PTFE and perfluorinated ethylene-propylene (F46) production, while the other is sold as a product (directly sent to other company by pipeline).

In 2004, the plant received CFC-113 consumption quota 4.5 MT ODS.

167.2 Verification

The verification team visited Jinan 3F on March 22-23, 2005 with accompanied by Li Yunpeng (SEPA officer). Name of the director and its contact information are as follow:

Mr. Song Zhide:	Vice General Manager
Telephone:	0531-5947408, 5901839, 5952244-2016
Fax:	0531-5951373
Address:	130 Jiluo Road, Jinan City, Shandong 250031, China

The mission took the following steps to verify CFC-113 consumption in 2004:

- Listened to the plant management's introduction on Jinan 3F's history and its CFC-113 consumption, TFE, PTFE and F46 production activities in 2004;
- Verified CFC-113 purchase from daily movement records of CFC-113 transferred from outside to plant warehouses;
- Verified CFC-113 opening and closing stocks from monthly CFC-113 inventories, including the amount of CFC-113 stored in the plant warehouse and the amount of CFC-113 remaining in the production storages.
- Verified CFC-113 consumption = CFC-113 purchase + CFC-113 opening stock - CFC-113 closing stock;
- Verified PTFE production from packaging records and PTFE transfer records (from production line to product warehouse);
- Verified PTFE sales from daily movement records of PTFE from product warehouse to outside for sale;
- Verified PTFE opening and closing stocks by PTFE closing stock = PTFE production + PTFE opening stock – PTFE sales;

- Verified F46 production, sales and stocks from F46 packaging records, F46 daily movement records, and F46 stock inventories;
- Verified TFE sales from monthly product transfer records from TFE line to outside;
- Verified number of operating days from daily production logs;
- Concurrently, a financial verification was conducted by reviewing and checking the plant's accounting system, the plant's annual report, and its financial accounting records related to CFC-113 purchase and consumption, PTFE production and sales, F46 production and sales, and TFE sales in 2004.

167.3 Conclusion

Table 167.3.1 CFC-113 purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
0.50	4.00	4.50	0.00	0.00

* Including the amount of CFC-113 in plant warehouse and in TFE production storages.

** Self uses in the plant for other applications.

Table 167.3.2 TFE production, consumption and stocks in 2004 (in MT)

Production	For PTFE	For F46	For sales	Stock*
3,224.86	2,595.61	61.65	567.60	0.00

* No TFE stock applied in the plant. All produced TFE is sent by pipeline directly to different applications for processing.

The number of operating days in 2004 is 336.29 days. The average CFC-113 consumption ratio in 2004 is 1.40 kg/MT TFE.

For further details, please see Annex I (File: Annex I_PTFE#167_Jinan 3F).

167.4 Financial verification summary

Financial verification has different results with production verification.

The opening stock of CFC-113 by production verification referred to the stock in production plant which was consumed financially in 2003.

The discrepancies of PTFE between financial verification and production verification could not be explained by Jinan 3F.

For further details, please see Annex III, Para. 61 to 71.

PTFE#169: Fuxin Fluoro-Chemical Co., Ltd

169.1 Enterprise background

Fuxin Fluoro-Chemical Co. Ltd. (Fuxin Fluorochemical) was a state-owned company established in 1968. The enterprise has one TFE and PTFE production line constructed in 1988 and completed in 1991, with annual capacity of 1,000 MT/a. After expansion, the line reached a capacity of 2,000 MT/a in the year of 2002.

CFC-113 is used as a process agent in manufacture of tetrafluoroethylene (TFE). All produced TFE is sent for PTFE production. In 2004, the enterprise received 2.5 MT of CFC-113 consumption quotas for 2004 production.

In August 2004, the enterprise's ownership was transferred to a private-owned group company (Tianhe Chemicals). The enterprise's name was changed to Fuxin Hengtong Fluoro-Chemical Co., Ltd.

Due to the ownership transfer, the plant stopped PTFE production in July 2004 and not resumed until February 2005. The plant management claims that, during the period, the CFC-113 based TFE recovery system was dismantled and converted to a non-ODS process.

169.2 Verification

The verification team visited Fuxin on March 18, 2005 with accompanied by Gong Xingming (SEPA officer). Name of the director and its contact information are as follow:

Mr. Sun Dequan:	Vice General Manager
Telephone:	0418-2558818
Fax:	0418-2570603
Address:	Xibu Street, Haizhou District, Fuxin City, Liaoning 123002, China

The mission took the following steps to verify CFC-113 consumption in 2004:

- Listened to Mr. Sun's introduction on Fuxin Fluochemical's history and plant activities in 2004;
- Verified CFC-113 purchase from original records of CFC-113 transferred from outside to plant warehouses;
- Verified CFC-113 opening and closing stocks from monthly CFC-113 inventories (only the amount of CFC-113 stored in the plant warehouse is accounted)
- Verified CFC-113 consumption = CFC-113 purchase + CFC-113 opening stock - CFC-113 closing stock;
- Verified PTFE production and number of operating days from daily production logs kept in workshop;

- PTFE product movement records, stock inventories, and sale records are all not available. The plant explained that these documents were lost due to the enterprise ownership transfer, as former employees who worked in plant financial department, product warehouse, and sales department were all dismissed by the new owner without exemption.
- Visited production line of PTFE and TFE recovery system where CFC-113 was used as PA, and took video and photos.
- Visited CFC-113 warehouse, and took video and photos.

169.3 Conclusion

Table 169.3.1 CFC-113 purchase, consumption and stocks in 2004 (in MT ODS)

Opening stock*	Purchase	Consumption	Other uses**	Closing stock*
1.00	2.50	1.50	0.00	2.00

* Only the amount of CFC-113 remaining in the plant warehouse.

** Self uses in the plant for other applications.

Table 169.3.2 PTFE production, sales and stocks in 2004 (in MT)

Opening stock*	Production	Consumption*	Other uses**	Closing stock*
/	866.94	/	/	/

* No records of PTFE stock inventory, product movements or sales data available for verification.

The number of operating days in 2004 is 153.25 days. The average CFC-113 consumption ratio in 2004 is 1.73 kg/MT.

The mission visitors' physical inspection on production site shows that the CFC-113 based TFE recovery system still remain in the line without dismantling or substituting. 2 tons CFC-113 stocks are stored in the plant warehouse.

For further details, please see Annex I (File: Annex I_PTFE#169_Fuxin Fluorochemical).

169.4 Financial verification summary

Due to the reorganization of Fuxin Hengtong, 20% of workers including all financial staff were dismissed. Consequently all financial materials including financial reports, books, and original documents are lost. Under such circumstance, the financial verification on PTFE production and CFC-113 consumption could not be conducted.

ANNEXES

ANNEX I 2004 PA Consumption Verification Reports (for 15 individual plants)
(See a separate file folder: Annex I of 2004 PA Verification Report)

ANNEX II 2004 PA Plant Closure Verification Reports (for 10 individual closed plants)
(See a separate file: Annex II of 2004 PA Verification Report)

ANNEX III Financial Verification Report of 2004 PA Consumption in China
(See a separate file folder: Annex III of 2004 PA Verification Report)

ANNEX IV Photos and Video CDs of Plant Closures for each of the 10 closed plants)
(Physically submitted to the Bank's Beijing Office on April 22, 2005)