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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Fiftieth Meeting
New Delhi, 6-10 November 2006

PROJECT PROPOSALS: CHINA

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

Aerosol

- Sector plan for phase-out of CFCs in the China pharmaceutical aerosol sector World Bank

Halon

- Sector plan for halon phase-out: 2007 annual programme World Bank

Process agent

- Phase-out of the production and consumption of CTC for process agent and other non-identified uses (phase I): 2007 annual programme World Bank
- Sector plan for phase-out of ODS process agent applications (phase II) and corresponding CTC production: 2007 annual programme World Bank

Production

- Sector plan for the CFC production phase-out: 2007 annual programme

Solvent

- ODS phase-out in China solvent sector: 2007 annual programme UNDP

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

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PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS CHINA

PROJECT TITLE**BILATERAL/IMPLEMENTING AGENCY**

Sector plan for phase-out of CFCs in the China pharmaceutical aerosol sector	World Bank
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NATIONAL CO-ORDINATING AGENCY:

State Environment Protection Administration

LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT**A: ARTICLE-7 DATA (ODP TONNES, 2005, AS OF OCTOBER 2006)**

CFC	-		
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B: COUNTRY PROGRAMME SECTORAL DATA (ODP TONNES, 2005, AS OF OCTOBER 2006)

ODS	Aerosol	Foam	Ref.	ODS	Solvents	Process agent	Fumigant
CFC-11	101.98						
CFC-12	374.264						

CFC consumption remaining eligible for funding (ODP tonnes)**CURRENT YEAR BUSINESS PLAN:** Total funding: US \$5,375 million: Total phase-out: 345.0 ODP tonnes

PROJECT DATA		2006	2007	2008	2009	2010	Total
CFC (ODP tonnes)	Montreal Protocol limits	4,471.5	4,471.5	4,471.5	4,471.5	Tbd	
	Annual consumption limit	8,385.57	8,385.57	8,385.57	8,385.57	Tbd	
	Annual phase-out from ongoing projects	485.1	485.1	0	0	0	485.1
	Annual phase-out newly addressed						
	Annual unfunded phase-out						
TOTAL ODS CONSUMPTION TO BE PHASED OUT		485.1	485.1	0	0	0	485.1
Total ODS consumption to be phased-in (HCFCs)							
Project cost as originally submitted (US \$)							
Final project costs (US \$):							
Funding for World Bank		12,680	0	0	3,247	0	15,927
Total project funding		12,680	0	0	3,247	0	15,927
Final support costs (US \$):							
Support cost for World Bank		951	0	0	244	0	1,195
Total support costs		951	0	0	244	0	1,195
TOTAL COST TO MULTILATERAL FUND (US \$)		13,631	0	0	3,491	0	17,122
Final project cost effectiveness (US \$/kg)							

FUNDING REQUEST: Approval of funding for the first tranche (2006)] as indicated above.**SECRETARIAT'S RECOMMENDATION**

Pending

PROJECT DESCRIPTION

1. On behalf of the Government of China, the World Bank has submitted a sector plan for phase-out of CFC consumption in China's pharmaceutical aerosol sector (Pharmaceutical Aerosol Plan), at a total cost to the Multilateral Fund of US \$15,926,838, plus agency support costs of US \$1,194,513, for consideration by the Executive Committee at its 50th Meeting. A copy of the Pharmaceutical Aerosol Plan as submitted by the World Bank is attached to the present document.

Project summary

2. According to the proposal, there are 39 pharmaceutical aerosol enterprises in China, with 48 production lines and 63 pharmaceutical aerosol products (42 skin aerosol products and 21 cavity aerosol products). The average CFC consumption for the production period 2003-2005 has been estimated at 485.1 ODP tonnes of CFC-11 and CFC-12. Of all the production facilities, 32 enterprises with 22 production lines would be eligible to receive assistance from the Multilateral Fund. Thus, the total amount of CFCs that will be phased out through the Pharmaceutical Sector Plan has been estimated at 464.4 ODP tonnes.

3. The Pharmaceutical Aerosol Plan proposes the replacement of CFC propellants by HFC-134a. The total cost of the Pharmaceutical Aerosol Plan has been based on the following unitary costs:

Cost Item	Unitary Cost (US \$)	Units	Total Cost (US \$)
Technical assistance	1,100,000	1	1,100,000
Screening substitutes	43,750.00	63	2,756,250
Technical dossier for skin aerosols	75,000.00	42	3,150,000
Technical dossier for cavity aerosols	93,750.00	21	1,968,750
Plant modifications (skin aerosol line)	63,750.00	14	892,500
Plant modifications (cavity aerosol line)	38,750.00	8	310,000
Production validation (per production line)	37,500.00	22	825,000
Training programme (per production line)	17,500.00	22	385,000
Operating cost	3,536,824	1	3,536,824
Contingency	1,492,432.00	1	1,492,432
Adjustment (foreign ownership)	(489,918.00)	1	(489,918)
Total			15,926,838

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

4. The Secretariat undertook a thorough analysis of the project proposal and provided detailed comments and observations to the World Bank. The main issues raised by the Secretariat's review can be summarized as follows:

- (a) Date of establishment of production lines;
- (b) Assistance for pharmaceutical products which are not currently being produced;
- (c) Industrial rationalization;

- (d) Selection of alternative propellant and production line modifications;
- (e) Issues related to technical assistance;
- (f) Cost-effectiveness; and
- (g) Level of funding proposed.

5. A summary of the issues raised by the Secretariat and responses received from the World Bank are presented below.

Date of establishment of production lines

6. In reviewing the information presented in the Pharmaceutical Aerosol Plan, the Secretariat noted that eight of the 39 enterprises identified were established after the cut-off date of 25 July 1995, as shown in Table 1 attached. The total CFC consumption of these enterprises is 2,682 ODP tonnes (representing 0.55 per cent of the total CFC consumption in pharmaceutical aerosols) and the total amount of funding being requested is US \$2,050,000. On the basis of decision 17/7 (i.e., in the light of technological advances, not to consider any projects to convert any ODS-based capacity installed after 25 July 1995), these enterprises are not eligible for funding.

7. The World Bank responded by stating that substitute technologies were not available in the pharmaceutical sector in China in 1995. In fact, pharmaceutical aerosols were specifically excluded from the CFC ban in China's 1997 ODS regulation. According to the World Bank, decision 17/7 applied to the foam, refrigeration and general aerosol sectors, not the pharmaceutical aerosol sector. For this reason, the Executive Committee had not approved a single pharmaceutical aerosol project before 1995.

8. The Secretariat wishes to note, however, that the Executive Committee has approved the following five investment projects for the phase-out of CFCs used in the production of pharmaceutical aerosols in three countries, as shown in the table below. The issue of availability of substitute technologies prior to 1995 was not raised in any of these projects:

Country	Project	ODP Tonnes	CE (US \$/kg)	Date of Approval
India	Aerosol Conversion at Midas Care Pharmaceuticals	25.20	4.40	Mar-98
India	Aero Pharma aerosol conversion	36.00	1.74	Nov-93
India	Terminal umbrella project in the aerosol sector	132.50	4.40	Nov-02
Macedonia	Phase-out of CFC-11 and CFC-12 in the manufacture of aerosols by conversion to HFC and hydrocarbon propellants at Alkaloid A.D.	25.00	4.40	Dec-00
Romania	Phase-out of CFC-12 in the manufacture of pharmaceutical aerosols by conversion to HFC-134a propellant at MEBRA, Brasov (terminal aerosol sector project)	46.50	4.40	Dec-04

Assistance for pharmaceutical products which are not currently being produced

9. The Secretariat pointed out that 14 enterprises included in the Pharmaceutical Aerosol Plan have no reported CFC baseline consumption, as shown in Table 2. For these enterprises, US \$2,832,500 (equivalent to 18 per cent of the total cost of the Pharmaceutical Aerosol Plan) is

being requested solely for screening of substitutes (at US \$43,750 per product) and for the preparation of technical dossiers (at US \$75,000 for each skin aerosol and US \$93,750 for each cavity aerosol). At its 16th Meeting, the Executive Committee decided that ODS consumption should be calculated on the basis of either the year, or an average of the three years, immediately preceding project preparation. Therefore, the enterprises in question are not eligible for financial assistance from the Multilateral Fund.

10. The World Bank recognized that not all of the companies in the project proposal have yearly production planning for all the pharmaceutical aerosol applications. However, China's Drug Administration Law makes it mandatory to submit any alteration to an approved drug to the drug regulation agency before it can be produced at a later date. Funding for screening substitutes and tests for registration for these enterprises is needed since the phase-out of CFCs in pharmaceutical aerosols can only be ensured when the enterprises have completed their substitute screening and registration processes. Furthermore, if left alone, some companies might resume production with CFCs and could undermine the phase-out programme.

11. Based on the rules of the Multilateral Fund, the Secretariat concludes that only 16 enterprises are eligible for funding (as shown in Table 3), since they were established prior to 25 July 1995, have CFC baseline consumption and are currently using CFCs (i.e., 418.34 ODP tonnes after considering the foreign ownership component of two of the enterprises).

Industrial rationalization

12. In reviewing the CFC consumption by type of aerosol produced by each of the 16 enterprises eligible for funding (Table 4), the Secretariat noted that:

- (a) CFC consumption for the manufacture of 12 pharmaceutical aerosols is very small, ranging from 3 kg per year to 797 kg per year;
- (b) Except for one enterprise (No. 24 with a total CFC consumption of 273.3 ODP tonnes represents 56.3 per cent of the total CFC consumption in the sector), the number of aerosol cans produced varies from less than one can per day to a maximum of 4,505 cans per day. This production is very small; and
- (c) The total amount of CFCs used for the production of the 6 cavity aerosol products is only 6.494 ODP tonnes/year (i.e., less than 1.5 per cent of the total amount of CFCs used by these enterprises), with a total production of 208,384 cans per year (less than 3.0 per cent of the total production of cans).

13. In response to the Secretariat's analysis, the World Bank said that small production amounts for some of the companies did not reflect the importance of the product. The small CFC consumption for the manufacture of 12 pharmaceutical aerosols was due to market and clinical demands, frequency of use and price, which made production output vary considerably. Furthermore, the data presented in the proposal was based on actual production by the enterprises, which could be expanded at any time once the legally prescriptive conditions and capacity for production were achieved.

14. In addition to its observations with regard to the distribution of CFC use among companies, the Secretariat pointed out that, contrary to the practice in formulating several of the

national sectoral phase-out plans approved for China and all other Article 5 countries, industrial rationalization had not been considered in the Pharmaceutical Aerosol Plan. The World Bank responded that China had changed, and industrial rationalization was no longer a matter of dictating a single measure, but rather a matter of entering into voluntary agreements with the various companies.

Selection of alternative propellant and production line modifications

15. The Pharmaceutical Aerosol Plan proposes to replace CFCs with HFC-134a. Except for those cavity pharmaceutical aerosols that are applied to the mouth (and which represents a very small percentage of the overall pharmaceutical aerosols in China), expert advice available to the Secretariat indicates that other products could be converted using hydrocarbon propellants. This conclusion, which was questioned by the World Bank, is based on documented evidence of HC propellant use in pharmaceutical aerosol products available worldwide,¹ and on the Secretariat's experience with projects for the conversion of pharmaceutical aerosols funded by the Multilateral Fund in at least three Article 5 countries, where several pharmaceutical aerosols are currently being produced with HC propellants.²

16. The Pharmaceutical Aerosol Plan estimated the capital costs for the conversion of the 22 production lines from CFCs to either HFC-134a propellant at US \$1,202,500, or to hydrocarbon (HC) propellant at US \$7,920,000. The cost analysis for the conversion to HFC-134a propellant was based on a unitary cost of US \$63,750 for each of the 14 lines used for the production of skin aerosol products and a unitary cost of US \$38,750 for each of the 8 lines used for the production of cavity aerosol products. The cost analysis in the Pharmaceutical Aerosol Plan for the conversion to HC propellant was based on a unitary cost of US \$360,000 for each of the 22 production lines (which includes US \$190,000 for the replacement of the existing production lines).

17. However, this cost analysis fails to acknowledge that there is no need to replace the entire production line when replacing CFC with HC propellant and that within the level of funding that has been approved in aerosol projects (including pharmaceutical aerosols) safety equipment to properly handle HC can be installed, and technology transfer for the reformulation of the aerosol products and training can be provided. HC technology would yield operating savings of US \$745,000 for a two-year period (assuming US \$1.00/kg of HC, compared to the actual price of US \$7.38/kg of HFC-134a), whereas the Pharmaceutical Aerosol Plan is requesting US \$3,536,824 as incremental operating costs for HFC-134a technology. Furthermore, the proposal to replace the production lines (at a cost of US \$190,000 per line), would imply an increase of the production capacity for the majority of the lines.

¹ A few examples of these products are the following: hydrocortisone acetate and pramoxine hydrochloride topical aerosol foam for anal use; topical corticosteroids used as anti-inflammatory and antipruritic agents; several anti-fungi aerosols for treatment of tinea pedis (athlete's foot), tinea cruris (jock itch) and tinea corporis due to *T. rubrum*, *T. mentagrophytes* and *E. floccosum*, exclusive of nails and hair area; betamethasone valerate for the treatment of corticosteroid-responsive scalp dermatoses; first aid antiseptic liquid bandage spray; aerosol formulation containing beclomethasone dipropionate; and topical anaesthetic spray containing benzocaine as active ingredient).

² These products include: pain relief and muscle relaxant which uses methyl salicylate and allied chemicals; local anaesthetic having a chemical like lidocaine; pharmaceutical product for skin burns relief and remedy having antiseptics and anaesthetics; povidone iodine (broad spectrum antiseptic and antifungal); antiseptic air freshener containing BKC; medicinal body deodorant; and wound dressing aerosol which contains cetrimide; dental products containing lidocaine and other chemicals to stop bleeding; and rubbing alcohol spray for massage containing isopropyl alcohol.

18. In response, the World Bank enumerated the benefits of the chosen HFC-134a technology including that HFC-134a is produced in China, and shares more similarities with CFCs, entailing fewer changes in the production line and facilitating the process of registering substitutes. With regard to altering production equipment, the World Bank pointed out that there are many differences in equipment types and models in the pharmaceutical aerosol production lines in China. Given the advances in pharmaceutical manufacturing machines, it would be impractical to purchase the low-level equipment needed to replace the current combination of automatic and semi-automatic production lines, particularly since the principle of the programme is to maintain the original scale and level of production without enlarging or reducing the production capacity.

19. With regard to the capital cost savings represented by HC technology, according to the World Bank, after the replacement of CFCs the quantity of HC used in each aerosol must be determined according to the result from the substitute-screening test. Assuming that the proportions of drug solution and propellant were almost unchanged, the low density of hydrocarbons would require the volume of tanks to be increased by more than 50 per cent, thus increasing costs by about 30 per cent.

20. Finally, the World Bank stated that the price of aerosol-grade HC on the domestic market is about US \$1.56 kg, and went on to say that price was not the only factor in determining the best substitute. The World Bank expressed the view that, according to its cost assessment of the various substitutes, the proposal for funding was based on the least costly option.

Issues related to technical assistance

21. In reviewing the unitary costs proposed in the Pharmaceutical Aerosol Plan, the Secretariat noted that US \$1.1 million has been requested for technical assistance activities, which include workshops, training programmes, public awareness activities, consultants, study tours and other unidentified activities. An additional US \$9,085,000 has been requested for the following activities, which are also related to technical assistance: US \$2,756,250 for screening substitutes, US \$5,118,750 for the preparation for technical dossiers for registration; US \$825,000 for production validation; and US \$385,000 for staff training. In many cases, this would constitute double counting since similar activities are requested more than once (i.e., toxicological evaluations and tests, studies on quality, training for sales staff).

22. Furthermore, the Secretariat pointed out that the levels of the funding being requested for screening substitutes and for the preparation of technical dossiers are the same, irrespective of the production levels of each product, i.e., US \$118,750.00 for the production of 323 cans per year for one skin aerosol product, while a similar amount is requested for 5,306,667 cans per year for another skin aerosol product. The eligibility for the preparation of technical dossiers for registration has to be further demonstrated. For instance, only those CFC-based pharmaceutical aerosols for which a technical dossier had been prepared prior to July 1995 might be considered eligible for funding. The level of incremental funding could only be assessed on the basis of the costs actually paid for the technical dossier.

23. Similarly, the request for production validation is the same irrespective of the production output and nature, i.e., US \$37,500 for a production line of 79 cans per year or for a production line of 5,306,667 cans per year. Here too, the eligibility of the request for production validation

has to be further demonstrated. Only those CFC-based production lines that have already been validated might be considered eligible for funding.

24. In response to the double-counting issue raised by the Secretariat, the World Bank stated that the training under the technical assistance programme includes: the protection of the ozone layer; the implementing procedures and requirement for the Fund-supported ODS phase-out programme; instruction for purchasing, financing and reporting; auditing requirements; and policy. However, the training conducted for each enterprise consists of the introduction of substitutes or substituting techniques at the production lines.

25. With regard to the preparation of technical dossiers, the World Bank clarified that obtaining approval from the drug regulation agency usually takes three to four years. Therefore, the research and development of pharmaceutical aerosol applications approved in July 1999 must have started in 1995 or before. Due to the particularity of drug administration regulations, the proposal suggests that 1 July 1999 may be specified as the cut-off date in China's pharmaceutical sector. Furthermore, when one application is produced by several enterprises, the production process is often different, and thus the technical dossier must be finished independently, which is why 24 technical dossiers must be submitted by 16 enterprises for the 20 applications.

26. Finally, with regard to the cost of screening and product validation, the World Bank advised that, since the substitute screening and tests for registration are required by law, the necessary procedures for the CFC conversion programme are independent of the quantities of an aerosol being manufactured. Finally, due to the specificity of drugs, the cost of technical activities carried out to meet legal requirements is very high, and there is no direct relation with the level of production of pharmaceutical aerosols or the CFCs consumption.

Cost-effectiveness

27. In reviewing the Pharmaceutical Aerosol Plan, the Secretariat developed a table associating each unitary cost proposed in the Plan to each of the 16 eligible enterprises (Table 5). In this analysis, the total requests for technical assistance (US \$1,100,000) and operating costs (US \$3,536,824), were divided by the total amount of CFCs to be phased out (i.e., 465.355 ODP tonnes) and pro-rated among the 16 enterprises eligible for funding on the basis of their total CFC consumption.

28. Based on this analysis, the Secretariat noted that the overall cost-effectiveness (CE) of the project as submitted is US \$34.30/kg, which is almost 8 times the CE threshold for the aerosol sector established by the Executive Committee at its 16th Meeting (i.e., US \$4.40/kg). The CE of the seven "most cost-effective" enterprises ranges from US \$11.94/kg to US \$57.65/kg. Four enterprises have a CE value between US \$109.12/kg and US \$645.86/kg. The five "least cost-effective" enterprises have CE values between US \$1,151.81/kg and US \$40,278.84/kg.

29. The Secretariat's analysis also shows that the most cost-effective enterprise is the largest producer of pharmaceutical aerosols in China (plant No. 24), with a CE of US \$11.70/kg. US \$2,081,879 of the total cost for the conversion of the enterprise (US \$3,198,809) is operating costs associated with HFC-134a technology. If the enterprise was to be converted to HC, and the associated operating savings were not discounted from the total cost, the CE of the conversion would be US \$3.56/kg.

30. In response to the Secretariat's observations, the World Bank admitted that the CE of the project is high. However, as this is a new sector, the Bank disagreed that the threshold of US \$4.40/kg for general aerosol could be applied, particularly since cost elements not relevant to general aerosols are necessary for pharmaceutical aerosols. The Executive Committee has not yet discussed, nor decided on policies and guidelines for the pharmaceutical aerosol sector.

31. Also according to the World Bank, the method used to calculate the CE is inapplicable to pharmaceutical aerosols. Although substitute screening and tests for registration are the key points to ensure the phase-out of CFCs, they belong to the scope of the technical activity. By subtracting these two costs, and the cost for the use of a substitute (at US \$5,593,869), the overall CE value is between US \$6.45 US \$6.71 per kg.

32. The Secretariat further notes that the five pharmaceutical aerosol projects that have been funded by the Fund had a CE equal to or below the CE threshold of US \$4.40/kg for the aerosol sector. The projects covered all eligible costs associated with the replacement of CFCs to either HC or HFC-134a propellants, including capital costs, operating costs/savings, activities relative to technology transfer and training.

Level of funding proposed

33. Taking into consideration that only 1.4 per cent of the total eligible CFC consumption is for the production of the cavity aerosol products for which HFC-134a might be required, it would appear that CFCs could be replaced by HC for the production of the majority of pharmaceutical aerosol products. On the basis of the level of CFC consumption at the enterprise level (from 13 kg per year to a maximum of 273,333 kg per year), and based on the experience gained in the Multilateral Fund for the conversion of aerosol production lines, and consistent with the current policies and guidelines of the Multilateral Fund, the Secretariat concluded that the total incremental cost of the Pharmaceutical Aerosol Plan should be based on the CE threshold value for the aerosol sector plus additional support (possibly 20 per cent of the total cost) for technical assistance activities.

34. The World Bank responded that, while the project is not as cost-effective as the Secretariat might want, all of the costs are incremental and eligible and should be considered as such. It reiterated that the pharmaceutical aerosol sector includes components that are not relevant to the general aerosol sector, hence the CE for that sector should not be applied. Finally, the 1995 cut-off date should not be applied, since the technology was not available in China at that time.

RECOMMENDATION

35. Pending.

Table 1 – List of enterprises established after 25 July 1995

No.	Name	Lines	CFC (kg)	Skin Products	Cavity Products
17	Shandong Bencao Pharmaceutical Co., Ltd	1	428	-	A26, A38
26	Huayi Pharmaceutical Co., Ltd	1	380		A41
28	Heilongjiang Tianlong Pharmaceutical Co., Ltd	2	300	A23, A25, A29	A15, A40
29	Guizhou Hongyu Pharmaceutical Co., Ltd	1	1,231	A36	A01
30	Sanpu Pharmaceutical Co., Ltd	0	13	-	A04
33	Sanjing Pharmaceutical Co., Ltd of Harbin Pharmaceutical Group	1	145	A23	A18, A21, A44
34	Hubei Lishizhen Medical Group Co., Ltd	1	137	A37	-
35	Shannxi Fengwuchendayaotang Pharmaceutical Factory Co., Ltd	1	48	-	A31
	Total	8	2,682		

Table 2 – List of enterprises with no CFC consumption

No.	Name	Ownership %	Skin Products	Cavity Products
2	Beijing Haiderun Pharmaceutical Co., Ltd	100	A25, A28, A30	
3	Guangzhou Baiyunshan Hejigong Pharmaceutical Co., Ltd	100	A09, A23	A40
4	Externally Applied Agent Factory of Guangzhou Baiyunshan Pharmaceutical Co., Ltd	100	A23	
6	Beijing Double-Crane Modern Pharmaceutical Technology Co., Ltd	100	A25	
8	Xinyi Pharmaceutical General Factory of Shanghai Pharmaceutical Group Co., Ltd	100	A24, A35	A06
10	Shanghai Fuxingzhaohui Pharmaceutical Co., Ltd	100	A42	
15	Harbin Hengchang Pharmaceutical Co., Ltd	100	A25	
22	Hangzhou Sino-US Huadong Pharmaceutical Co., Ltd	75	A23	
25	Chongqing Kerui Pharmaceutical Co., Ltd	100	A10	A12
31	Guangzhou Dongkang Pharmaceutical Co., Ltd.	100	A16	
36	Harbin Guangji Pharmaceutical Factory	100	A29	
37	Nantong Zhongbao Pharmaceutical Co., Ltd	100		A20
38	Xian Lisheng Pharmaceutical Co., Ltd	100	A25	
39	Anshan No.1 Pharmaceutical Factory	100		A38

Table 3 – List of enterprises eligible for funding

No.	Name	Ownership %	Lines	Total CFC (kg)	Eligible CFC (kg)	Skin products	Cavity products
1	Wuxi Shanhe Group No.1 Pharmaceutical Co., Ltd	100	2	823	823	A10, A23	
5	Guiyang Dechangxiang Pharmaceutical Co., Ltd	100	1	13	13		A07
7	Beijing Tongrentang Technology Development Corporation	100	1	14	14	A35	A21, A34
9	Fujian Nanshaolin Pharmaceutical Co., Ltd	100	1	10,684	10,684	A22, A33	
11	Penglai Nuokang Pharmaceutical Co., Ltd	100	1	3,491	3,491	A23	
13	Hubei Nanyang Pharmaceutical Co., Ltd	70	1	49,393	34,575	A29	
14	Shenyang Jingcheng Pharmaceutical Co., Ltd	50	1	57,717	28,859	A17	
16	Pharmaceutical Factory of Hunan Bencao pharmacy Co., Ltd	100	1	1,300	1,300	A16	

No.	Name	Ownership %	Lines	Total CFC (kg)	Eligible CFC (kg)	Skin products	Cavity products
18	Shandong Jewim Pharmaceutical Co., Ltd BlueBox	100	1	12,080	12,080	A23	A38, A39
19	Suizhou Pharmaceutical Co. Ltd of Wuhan Jianmin Group	100	1	13	13	A14, A19	
20	Guizhou Antai Pharmaceutical Co., Ltd	100	1	20,827	20,827	A02, A08	
21	Guizhou Xinyi Pharmaceutical Corporation	100	1	229	229	A13	
23	Xinjiang Biochemistry Pharmaceutical Co., Ltd	100	1	2,592	2,592		A05
24	Yunnan Baiyao Group Corporation	100	1	273,333	273,333	A45	
27	Zhanjiang Xintongde Pharmaceutical Co., Ltd	100	1	29,397	29,397	A11, A22, A23, A27, A32	A38, A40
32	Shanghai Yishengyuan Pharmaceutical Co., Ltd	100	1	112	112	A11, A23	
	Total		17	462,018	418,342		

Table 4 – Production outputs by type of products manufactured by the 16 eligible enterprises

Application ID No.	Type of Aerosol	Plant ID No.	CFC (Kg/Year)	Cans/Year	Cans/Day*
A39	Cavity	18	3	79	<1
A14	Skin	19	6	323	1
A19	Skin	19	7	377	1
A07	Cavity	5	13	100	<1
A34	Cavity	7	14	1,267	5
A22	Skin	27	36	1,516	6
A23	Skin	1	106	3,435	13
A16	Skin	32	112	4,845	19
A13	Skin	21	229	8,333	32
A38	Cavity	18	392	10,328	40
A10	Skin	1	717	23,232	89
A22	Skin	9	797	3,636	14
A16	Skin	16	1,300	58,333	224
A08	Skin	20	1,773	49,377	190
A05	Cavity	23	2,592	50,000	192
A40	Cavity	27	3,480	146,610	564
A23	Skin	11	3,491	100,600	387
A32	Skin	27	5,583	235,209	905
A33	Skin	9	9,851	44,935	173
A23	Skin	18	11,685	307,873	1,184
A02	Skin	20	19,053	530,622	2,041
A23	Skin	27	20,334	856,662	3,295
A29	Skin	13	49,393	1,171,333	4,505
A17	Skin	14	57,717	968,533	3,725
A45	Skin	24	273,334	5,306,667	20,410
Total			462,018	9,884,225	

(*) Based on 8-hour 260 working days per year.

Table 5 – Analysis by the Fund Secretariat of the submitted cost of the Pharmaceutical Aerosol Plan for all eligible enterprises

No	Name	CFC eligible	TAS	Screen	Dossier	Plant mod.	Validate	Training	Operating Cost	Contingency	Total Cost	CE
1	Wuxi Shanhe Group No.1 Pharmaceutical Co., Ltd	823	1,950	87,500	150,000	127,500	75,000	35,000	6,268	48,322	531,540	645.86
5	Guiyang Dechangxiang Pharmaceutical Co., Ltd	13	31	87,500	187,500	38,750	37,500	17,500	99	36,888	405,768	31,212.91
7	Beijing Tongrentang Technology Development Corporation	14	33	131,250	262,500	63,750	37,500	17,500	107	51,264	563,904	40,278.84
20	Guizhou Antai Pharmaceutical Co., Ltd	20,827	49,337	87,500	150,000	63,750	37,500	17,500	158,632	56,422	620,640	29.80
32	Shanghai Yishengyuan Pharmaceutical Co., Ltd	112	265	87,500	150,000	63,750	37,500	17,500	853	35,737	393,105	3,509.87
9	Fujian Nanshaolin Pharmaceutical Co., Ltd	10,684	25,309	87,500	150,000	63,750	37,500	17,500	81,376	46,294	509,229	47.66
11	Penglai Nuokang Pharmaceutical Co., Ltd	3,491	8,270	87,500	150,000	63,750	37,500	17,500	26,590	39,111	430,220	123.24
27	Zhanjiang Xintongde Pharmaceutical Co., Ltd	29,397	69,638	306,250	562,500	63,750	37,500	17,500	223,906	128,104	1,409,149	47.94
13	Hubei Nanyang Pharmaceutical Co., Ltd	34,575	81,904	43,750	52,500	63,750	37,500	17,500	263,346	56,025	616,275	17.82
14	Shenyang Jingcheng Pharmaceutical Co., Ltd	28,859	68,362	43,750	37,500	63,750	37,500	17,500	219,805	48,817	536,984	18.61
16	Pharmaceutical Factory of Hunan Bencao pharmacy Co., Ltd	1,300	3,080	43,750	75,000	63,750	37,500	17,500	9,902	25,048	275,529	211.95
18	Shandong Jewim Pharmaceutical Co., Ltd BlueBox	12,080	28,616	131,250	262,500	63,750	37,500	17,500	92,009	63,313	696,438	57.65
19	Suizhou Pharmaceutical Co. Ltd of Wuhan Jianmin Group	13	31	87,500	150,000	63,750	37,500	17,500	99	35,638	392,018	30,155.21
21	Guizhou Xinyi Pharmaceutical Corporation	229	542	43,750	75,000	63,750	37,500	17,500	1,744	23,979	263,765	1,151.81
23	Xinjiang Biochemistry Pharmaceutical Co., Ltd	2,592	6,140	43,750	93,750	38,750	37,500	17,500	19,742	25,713	282,846	109.12
24	Yunnan Baiyao Group Corporation	273,333	647,492	43,750	75,000	63,750	37,500	17,500	2,081,879	296,687	3,263,558	11.94
	Total	418,342	991,000	1,443,750	2,583,750	1,033,750	637,500	297,500	3,186,357	1,017,361	11,190,967	26.75

SECTOR PLAN FOR HALON PHASE-OUT: 2007 ANNUAL PROGRAMME

PROJECT DESCRIPTION

36. In accordance with the Executive Committee's approval of the Sector Plan for Halon Phase-out (decision 23/11) and the CFC/CTC/Halon Accelerated Phase-out Plan in China (decision 44/59), China is requesting, through the World Bank, the release of the tenth tranche of US \$400,000 for the implementation of the 2007 annual programme and US \$30,000 in support costs. Details of the annual programme are provided in the request submitted by the World Bank that is available on the Multilateral Fund's intranet. The 2007 annual programme includes the following:

- (a) US \$400,000 to be used for technical assistance activities in order to support the halon phase-out programme and ensure that existing fire protection requirements can be met including:
 - (i) A study on test methods for water mist fire extinguishing systems;
 - (ii) Establishment of an engineering construction standard for HFC-23 fire extinguishers; establishment of a standard for the design, construction and acceptance of dry powder fire extinguishers;
 - (iii) Design of an integrated control technology for fire detection;
 - (iv) Training of personnel; and
 - (v) A performance audit.
- (b) Zero halon-1211 production or consumption; 100 metric tonnes of halon-1301 production excluding 20 metric tonnes of production for export and a ceiling of 100 metric tonnes for consumption; and
- (c) Five to nine contracts are to be signed for the conversion or closure of halon-1301 systems manufacturers.

37. There are no remaining halon-1211 production facilities in China. There are no fire-fighting equipment manufacturers currently in operation, with 61 having received funding and 15 closed without contracts or funding including 4 that were not identified in the original proposal. The Government of China will continue to implement tradeable production quotas and strengthen the ban on installation of new halon extinguishers for non-essential uses through a gradual tightening of the definition of essential uses. The Government of China will also take actions to support the halon recovery and recycling activities and to prevent unnecessary emission of halon-1211.

38. Actual halon-1211 and 1301 production and consumption in 2005 was lower than planned resulting in production of 2,492 ODP tonnes less than planned (2,142 ODP tonnes of halon-1211 and 350 ODP tonnes of halon-1301) and consumption of 2,872 ODP tonnes less than planned as shown in the following table:

	Planned (metric tonnes)	Actual (metric tonnes)	Difference (metric tonnes)	Difference (ODP tonnes)
Halon-1211 Production	1,990	1,276	714	2,142
Halon-1211 Consumption	1,890	1,046	844	2,532
Halon-1301 Production	200	165	35	350
Halon-1301 Consumption	150	131	34	340

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

CO₂ fire extinguishers

39. The audit report confirms that China has achieved the targets of the 2005 work programme. Therefore, funds for the 2007 work programme can be released. However, there remain three issues that may warrant the Executive Committee's consideration concerning allocating funds through the flexibility clause for CO₂ fire extinguishers and halon-1301 as a feedstock.

40. At its 47th Meeting, the Executive Committee approved the 2006 tranche of the halon sector plan and requested the Government of China and the World Bank to consider a cumulative audit of the halon plan as part of the 2006 work programme. According to the Bank, a review was undertaken and included in the annual programme. However, this review did not apparently provide information on the number of CO₂ extinguishers produced in the year 2005.

41. Under the original decision approving the China halon plan, China was required to produce 3.59 million extinguishers in 2005 (decision 23/11, paragraph E). A financial penalty was associated with not achieving this target. However, the requirement was waived at the 44th Meeting and replaced with the following:

“Instead, in case of any shortfall, the equivalent amount of this refund will remain in China for capacity building to help China to comply with the Montreal Protocol commitments for activities in the China Convention Compliance Centre (decision 44/59, Annex XVII of document UNEP/OzL.Pro/ExCom/44/73, footnote 1)”.

42. China has indicated that 2.255 million CO₂ extinguishers were reported to be produced in 2004, but the 2005 investigation was still ongoing as of September 2006. The Fund Secretariat asked when the investigation was expected to be completed, but the Bank did not provide an answer.

43. The Fund Secretariat also notified the World Bank that a refund of US \$4,111,800 would result from a calculation assuming the same level of CO₂ production in 2005 as reported for 2004. This level of refund is lower than the US \$860,000 left to be approved for the entire halon sector plan including the US \$400,000 requested at this meeting. The Bank responded that it could not answer the question before the 2005 survey had been completed and a full report provided.

Implementation of decision 47/50 on allocating funds through the flexibility clause

44. At its 47th Meeting, the Executive Committee decided that "...the disbursement information should be provided cumulatively and data concerning actual or planned commitments could also be provided, as appropriate. The information should also specify how the relevant flexibility clause in the agreement was implemented and/or how to allocate unused funds from previous tranches..." (decision 47/50(b)(i)). The Bank was requested to provide the information required in decision 47/50 about the use of the flexibility clause. However, the Bank indicated that China was not requesting flexibility to use the funds for the plan. It should be noted however that US \$11.4 million had not been transferred by the World Bank to China and around US \$19.6 million of the amount approved for China had not been disbursed as at 31 July 2006. Therefore, there could be large plans for which the flexibility clause might need to be used based on the size of these balances.

Halon-1301 as a feedstock

45. In approving the 2006 tranche of the halon sector plan at its 47th Meeting, the Executive Committee encouraged the Government of China to limit its production of halon-1301, for the purpose of feedstock, to the levels allowed under the agreement to avoid any future unintentional consumption that would be in violation of the agreement with the Executive Committee and to seek to use more effective non-ODS alternatives if possible. Halon-1301 is used for producing pesticides, pesticide intermediates and pharmaceutical intermediates starting in 2003. A total of 277.02 metric tonnes of halon-1301 was produced in 2005.

46. Most of the consumption (112 of the total 277 metric tonnes) of halon-1301 as a feedstock is consumed by the Bayer CorpScience Hangzhou Company and at least four other companies. According to the technical review, China has given CRI (the halon-1301 producer) the following guidelines for selling halon-1301 as raw materials to pesticide producers namely that: "the halon-1301 should not have the possibility of harming the ozone layer; the production data on halon-1301 sold as feedstock must be reported to SEPA; and all original files should be kept for auditing purposes".

47. The technical auditors noted that most of the production equipment (two pipe reactors, bromination cauldron, water cooler, bromine stripping tower and bromine feed-in tanks) had been renewed in 2004 and the plant is in good technical shape with a production capacity of 600 metric tonnes. They indicated that it is more difficult to control whether halon-1301 to be used as fire extinguishing agent is being phased out according to the plan since the same production lines producing halon for fire extinguishers are also producing the halon for feedstock.

48. In responding to a question about the conclusions of the auditors, the World Bank indicated that the monitoring mechanism set up by China and the Bank is identical to the procedure used for CTC feedstock and process agent applications. The feedstock users are registered by the Government of China and must report their procurement and uses of halon-1301 as feedstock. China reports the feedstock uses to the Ozone Secretariat. The Bank stated that it had visited one of the feedstock users and verified the process used in China and the figures reported by the companies. The Bank indicated that since the system in place requires financial support, it did not know how the monitoring system would work after 2009.

Exports

49. A total of 32 metric tonnes of halon-1301 (320 ODP tonnes) were exported in 2005. Seven metric tonnes (70 ODP tonnes) of this amount were for supply to Taiwan.

50. The total halon-1211 and 1301 exports to Israel (270.6 ODP tonnes) and India (119.7 ODP tonnes) reported in the audit do not correspond to the zero consumption reported by those countries pursuant to Article 7.

RECOMMENDATION

51. The Executive Committee may wish to consider the above in the context of approving the China halon phase-out work programme for 2007.

PHASE-OUT OF THE PRODUCTION AND CONSUMPTION OF CTC FOR
PROCESS AGENT AND OTHER NON-IDENTIFIED USES (PHASE I):
2007 ANNUAL PROGRAMME

PROJECT DESCRIPTION

Introduction

52. The World Bank is submitting, to the 50th Meeting of the Executive Committee, the 2007 annual programme of the sector plan for phasing out the production and consumption of CTC for process agent and other non-identified uses (25 applications under phase I) on behalf of the Government of China. This is with the understanding that the request for the release of the sixth tranche of funding amounting to US \$5 million plus the associated support cost of US \$0.375 million will be submitted to the 51st Meeting with the submission of the verification of the implementation of the 2006 annual work programme. The 2007 work programme is not attached but could be made available upon request.

Background

53. 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 as process agents (phase I), and disbursed the first tranche of US \$2 million at the meeting to start implementation. China has committed to complying with the Montreal Protocol phase-out schedule for the controlled levels of CTC production and consumption (25 applications) by implementing the Agreement. Subsequently, between March 2003 and March 2006, the Executive Committee approved the 2003 to 2006 annual work programmes at a total funding level of US \$56 million. The production of CTC for controlled use and as a feedstock for CFC production was reduced from 64,152 ODP tonnes in 2001 when the phase-out plan was developed to 33,080 ODP tonnes in 2005. The consumption of CTC as a process agent for the 25 applications under phase I came down from 5,049 ODP tonnes in 2002 to 485.02 ODP tonnes in 2005.

54. The reduction targets and the associated funding levels for 2006 and 2007 are shown in the table below.

Table 1

Targets and Funding of the 2007 Annual Programme

Consumption	
CTC for 25 PA application	
2006	493 ODP tonnes
2007	493 ODP tonnes
Impact	0
CFC-113 for process agent	
2006	10.8 ODP tonnes
2007	Zero ODP tonnes

Impact	10.8 ODP tonnes
Production	
CTC	
2006	*28,618 ODP tonnes
2007	**18,782 ODP tonnes
Impact	9,880 ODP tonnes
Total MLF funding approved in principle	US \$65 million
Total funding released by the MLF by July 2006	US \$56 million
Level of funding requested	US \$5 million

* The 2006 target for CTC maximum allowable production and imports for CTC use as process agent and feedstock for CFC production was adjusted from 32,044 ODP tonnes to 28,618 ODP tonnes as a result of the approval of phase II of the CTC sector plan.

** This is the target for both phase I and phase II.

Project Description

55. The submission of the World Bank starts with Part A which contains a summary of the results from the implementation of the three annual work programmes from 2003 to 2005, as well as a progress report on the implementation of the 2006 annual programme. The status of implementation of the programme is summarised in the following tables, one on production and the other on consumption.

Table 2

Summary of implementation of the CTC production phase-out (phase I) as of August 2006

Year	No. of Producers	Target in Agreement	Actual Production	Reduction	Actions
		(ODP tonnes)			
2001	14	64,152	64,152	0	Baseline established
2003	15	61,514	59,859	2,638	Closure of one CTC producer(CTC4) Production cut by four producers two new CM producers set up (CTC14 & CTC15)**
2004	12	54,857	50,194	6,657	Closure of four producers (CTC3,7,10 &17) Production cut by four producers one new CM producer set up (CTC 16)**
2005	11	38,686	33,080	16,171	Closure of one producer (CTC6) Production cut by three producers
2006*	9	28,618	To be verified	10,068	Closure of one producer and two lines(CTC5, lines at CTC11 and CTC8), production cut by three producers

* Results in 2006 to be verified.

** CTC14, 15 and 16 were established after the 2001 baseline and not eligible for funding.

Table 3

**Summary of implementation of phasing out CTC and CFC-113 as a process agent (phase I)
as of August 2006**

ODS	Application	Annual consumption (ODP tonnes)			No. of Plants		Actions
		2003	2004	2005	2001	2005	
CTC	CR	965	1,963.5 2	210.5	8	3	Four plants closed in 2004 and one plant closed in 2005, three under contract for closure in 2009
	Endosulfan	359	0	0	2	2	Both closed in 2005
	CSM	1,338	1,343.5	230.4	3	1	Two closed and dismantled, one for emission control
	CP-70	694	225.4	0	12	0	11 closed and 1 converted to non-ODS
	Ketotifen	6	0	0	1	0	Converted to non-ODS technology
	Total	3,382	3,532.5	440.93			
CFC-113	PTFE	21.5	13.5	4	6	0	One plant merger, and five converted to non-ODS

56. The Government of China has continued to implement a number of policies to assist the implementation of the CTC sector plan. Specifically since 2003 a strict control was introduced on the construction and expansion of new CTC production facilities. The “Circular on Implementing Carbon Tetrachloride (CTC) Production Quota-License System” placed all CTC producers, including the newly erected chloromethane (CM) plants, under control. The three new CM producers were not eligible for production quota but could buy quotas from the existing CTC producers.

57. The “Circular on CTC Consumption Quota-License System”, issued in May 2003, required CTC dealers and consuming enterprises to register and apply permits both for selling and buying the controlled substance and submit quarterly reports to SEPA. In 2004 the control was extended to all CTC consumers, which included the 25 applications covered by the Agreement, other new process agent applications, non-ODS feedstock applications and solvents.

58. In 2004 the Government issued the “Circular on Management Procedures for Site Supervision of CTC Production Enterprises”, which introduced the same peer monitoring system used in the CFC production phase-out plan. The supervision included the newly established chloromethane producers.

59. In 2006 SEPA signed production reduction contracts with three CTC producers and closure contracts with one CTC distiller and two dedicated CTC production lines. These contracts were intended as the vehicle to ensure the achievement of the production target in the Agreement. Annex IV contains four tables which provide the production phase-out contracts between SEPA and the CTC producers in each of the 2003, 2004, 2005 and 2006 annual programmes.

60. On the consumption side, SEPA continued to use closure and conversion to achieve the reduction targets for CTC and CFC-113 in 2006 under phase I of the sector plan. As a result of the 2006 annual programme, there will be three chlorinated rubber (CR) producers and one chlorosulphonated polyefin (CSM) producer which will remain in production and consume CTC from phase I of the sector plan. Tables II-1 to II-5 in Annex II provide the details of the

activities on an enterprise level for each of the applications, with information on the number of the application, name of the enterprise, name of the product, capacity, CTC/CFC-113 consumption between 2001-2004, level of production between 2001-2004 and status of the plant. Annex V provides a list of the contracts that have been signed between SEPA and the enterprises.

61. There is an update on the CSM project in Jilin Province which is the only emission control project under phase I, but which has not fared well so far. The characteristic of the project is a drying screw expeller which is specially designed and imported to reduce CTC emissions in the drying process. The drying screw expeller was put into operation at the end of 2004 as planned. After the half year's test operation, it was found that the performance of the drying screw expeller could not meet the design requirements. The enterprise has entrusted several universities or research institutes to seek substitute technologies to replace the CTC consumption. If all efforts fail, the CTC consumption target for 2010 set by the Agreement may not be met.

62. The World Bank submission reports progress on a number of on-going activities under the technical assistance programme. Study on CTC incineration technologies and management under the 2004 AP and the verification of new CTC feedstock applications and dealers under 2005 AP are completed. For 2006, a domestic survey of non-ODS producers and CTC dealers under PAII is planned. SEPA is also planning an on-line monitoring system for CTC production which aims at collecting CTC production data more accurately and promptly by installing on-site on-line monitoring instruments which can replace site supervisors. The terms of reference is being prepared and is expected to be submitted for the World Bank's approval before December 2006.

63. A new technical assistance (TA) to assess the quality of CR products using CTC as process agent and aqueous CR products will be added to the 2006 annual program. Two to three CR enterprises are still using CTC as a process agent and must completely phase-out CTC before 31 December 2009. Several enterprises have been working to develop aqueous CR products in recent years. This TA intends to analyze technical indexes and quality of CR products, make comparisons, examine the impact on the paints sector of the phase-out of CTC for CR product, and make feasibility appraisal on conversion proposals of CR product.

64. Part B of the submission contains the proposed 2007 annual programme and covers the planned targets and the activities proposed to be undertaken to achieve these targets. The targets have been adjusted to reflect the impact of the accelerated phase-out plan and phase II of the sector plan. CTC production for controlled uses for both phase I and phase II of the sector plan and for feedstock use in CFC production should not exceed 17,075 MT (18,782 ODP tonnes), and the consumption of CTC for process agents under phase I should not exceed 493 ODP tonnes in 2007. The consumption of CFC-113 for process agents would be zero, as stipulated in the Agreement under phase I.

65. On the policy level, the Government plans to continue implementing the controls discussed in the preceding paragraphs both for the production and consumption of CTC. Furthermore, a new "ODS management regulation" has been under development since 2004. This draft consists of six chapters covering the management and monitoring of ODS production, consumption, use, sale, import and export and the related legal liabilities. By July 2006, the first round of collecting comments and opinions has been completed. The draft has been revised in

August 2006 and will be submitted to the meeting of the ministers of SEPA for review. Then, the draft will be submitted to the Regulation Department of the state council for further review. At the same time, a hearing will be conducted. After the review of the Regulation Department, the draft will be submitted to the meeting of the state council for final approval. It is foreseen that this Regulation would serve as a solid legal basis for sustainable ODS phase-out.

66. At the enterprise level, SEPA will sign one to two closure contracts and four production reduction contracts with CTC producers, resulting in closure contracts with Shanghai Chlor-Alkali and Quzhou Jiuzhou (residual distilling enterprise). In addition, there will be four production reduction contracts with co-producers to buy back their CTC production quotas to ensure achievement of the Agreement's targets. As these CM production facilities will remain in production, the facilities will not be dismantled.

67. The three CM producers without production in the baseline year (Wuxi Greenapple, Shandong Jinling and Shandong Dongyue) will establish their own disposal facilities for their surplus CTC co-products. This is vital to successfully implement the sector plan. In order to support and encourage them to set up conversion facilities to convert co-produced CTC as early as possible, the Chinese Government plans to provide some MLF funding to support the operational cost of the CTC conversion. On the consumption side, quotas will be assigned to each remaining eligible PA enterprise to ensure that the maximum allowable consumption limit in 25 applications does not exceed the Agreement's targets.

68. Table 8 in Part B provides targets for the 2007 annual programme and includes data on production, consumption, a comparison of 2006 and 2007 data, the reduction to be achieved, the level of funding for each category of activity, and monitoring indicators for key actions and dates. Table 9 provides a break-down of funding by policy action and enterprise activities under two categories of production and consumption, with key actions and dates of completion. Table 10 gives details on the technical assistance programme in 2007, with funding, action and dates of completion. The submission has six annexes: Annex I with two tables on gross production and status of CTC producers; Annex II with five tables on ODS consumption status; Annex III with one table on policies implemented; Annex IV with four tables on CTC production phase-out status; Annex V with one table listing contracts with process agent enterprises; and Annex VI with four tables on status of TA activities.

69. The submission estimates a total cost of US \$18 million to implement the 2007 annual programme, out of which US \$5 million will be from 2007 annual programme and US \$8 million from the unallocated balance of the 2006 annual programme of phase I. The balance of US\$ 6 million will be charged to the 2007 annual programme of phase II of the sector plan.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

70. The approval of the second phase of the sector plan at the 47th Meeting of the Executive Committee in March 2006 results in adjustment of the maximum allowable CTC production and imports for controlled use as process agents under both phases and as feedstock for CFC production from 32,044 ODP tonnes to 28,618 ODP tonnes in 2006. This was reflected in decision 48/25, under which the Executive Committee decided "to approve the revision of the

maximum CTC production target in the 2006 annual work programme of the CTC sector plan (phase I) to 28,618 ODP tonnes”. This is the sum of 21,276 ODP tonnes for CFC production (from the accelerated phase-out plan, APP) and 7,341 ODP tonnes allowed under the Montreal Protocol (15 per cent of the baseline plus 10 per cent of baseline for basic domestic needs). However the World Bank maintains that the target should remain at 32,044 ODP tonnes, as included in the APP.

71. The approval of phase II has no impact on the CTC consumption target for phase I in 2006. From what is reported on the progress in the implementation of the 2006 targets up to August 2006, there have been a number of activities such as closures and production cuts at the enterprise level to achieve the reductions required.

72. As per the request of the Executive Committee in decision 48/25 when approving the 2006 annual tranche for CTC phase I, there is an update on the further actions that have been undertaken to reduce the emission level by the CSM plant, which was experiencing difficulty in applying the imported technology to reduce CTC emission. However the update does not give any assurance of success and this could impact on the achievement of the target in the Agreement in 2010.

73. The Government of China has put in place rather strict controls on both CTC production and consumption, including the requirement for all the dealers and consumers of CTC to register and obtain permits, and for all the producers including the new chloromethane producers to produce under a permit. Furthermore, the Government has introduced the same on-site peer monitoring mechanism for the CTC producers that has been successfully applied in the case of the CFC producers. Furthermore, the new regulation on ODS which is being developed will provide strong legal grounds for enforcing and sustaining the phase-out.

74. The proposed 2007 annual work programme provides clear targets which are consistent with those from the Agreement and a plan of action which intends to continue the momentum and the implementation structure that has been built in the past four years.

RECOMMENDATIONS

75. In light of the uncertainty associated with the emission control project for the CSM application at the enterprise in Jilin Province and its likely implication on compliance with the Agreement, the World Bank is requested to provide an update on the project in the 2008 annual work programme.

76. In view of the disagreement on the maximum allowable CTC production and imports for process agent uses and as a feedstock for CFC production for 2006, the Secretariat is not in a position to make a recommendation at this time.

**SECTOR PLAN FOR PHASE-OUT OF ODS PROCESS AGENT APPLICATIONS
(PHASE II) AND CORRESPONDING CTC PRODUCTION:
2007 ANNUAL PROGRAMME**

PROJECT DESCRIPTION

Introduction

77. The World Bank is submitting to the 50th Meeting of the Executive Committee the 2007 annual programme of the sector plan for phasing out the production and consumption of CTC for process agent and other non-identified uses, (phase II), on behalf of the Government of China. This is with the understanding that the request for the release of the second tranche of funding amounting to US \$10 million plus the associated support cost of US \$0.75 million will be submitted to the 51st Meeting with the submission of the verification of the implementation of the 2006 annual work programme. The proposed 2007 annual work programme is not attached but could be made available upon request.

Background

78. At its 47th Meeting in 2005, the Executive Committee approved, in principle, the sector plan for phasing out the production and consumption of CTC for process agent and other non-identified uses in China (phase II) at a total level of funding of US \$46.5 million plus support costs of US \$3,487,500 for the World Bank. The Committee disbursed at the meeting US \$15 million plus support costs of US \$1.125 million and another US \$10 million plus US \$0.75 million as support cost at its 48th Meeting to the World Bank for the implementation of the 2006 annual work programme. Furthermore the Committee approved the Agreement for phase II of the sector plan at the 48th Meeting. The CTC reduction targets and fund disbursement schedule under the agreement are reproduced below.

Table 1**Allowable CTC Production and Consumption in Phase II and Agreed funding**

	Baseline (2003)	2006	2007	2008	2009	2010
1. Max allowed CTC production for consumption under the MP	29,367	7,386*	7,386	7,386	7,386	4,471
2. Max allowable CTC consumption as per the Montreal Protocol control measures	55,891	8,383	8,383	8,383	8,383	0
3. Max allowable CTC consumption for Phase I	5,049	493	493	493	493	220
4. Max allowable CTC consumption for Phase II	5,411	6,945**	6,945	6,945	6,945	994 ¹
5. Non identified CTC consumption	3,300	945	945	945	945	-
6. Max allowable amount of CTC used in process agent applications listed in the interim table A-bis of decision XVII/8 and in potential future process agent applications as identified and reported by China in its annual verification reports***	NA	14,300	14,300	14,300	14,300	0****
Multilateral Fund funding (in US\$ thousands)						TOTAL
7. MLF Funding for Phase II		25,000	10,000	10,000	1,500	46,500
8. Agency support costs for Phase II		1,875	750	750	112.5	3,487.5

Notes: 1. provided emissions are accepted by the Parties as eligible, under decision X/14

* The allowed CTC production for consumption includes the additional production of 10 per cent of base level allowed for basic domestic need from 2005 to 2009 and 15 per cent from 2010

** The Bank will verify consumption by companies and applications covered by the phase II Sector Plan (Row 4). The annual verification will cover a random selection of at least 30 per cent of all enterprises covering at least 30 per cent of the phase II consumption,

*** These figures are subject to reconfirmation at the 50th Executive Committee Meeting. The CTC use figures for the years 2007, 2008 and 2009 will be reviewed by the Executive Committee and may be amended. China will verify the annual amount of the CTC amounts used in those applications consistent with the procedures established for CTC feedstock uses and endorsed by Executive Committee at its 48th Meeting.

**** The amount of CTC used will be reduced to zero, or any insignificant levels of emissions which might be approved by the Parties, by 1 January 2010.

Project description

79. The submission of the World Bank for the 2007 annual work programme under phase II contains considerable common elements for the 2007 annual programme under phase I, and therefore the summary for phase II will only cover those elements which are specific to the second phase.

80. On progress on the 2006 work programme, it is reported that project implementation mechanism for phase II of the sector plan, as a supplement for the project implementation manual of China's ODS production sector, has been developed by SEPA and cleared by the World Bank in September 2006. This mechanism includes, among other things, eligibility of projects for grant compensation, participants and main responsibilities, implementation strategy, and project implementation modality (including closure, conversion, emission control and retroactive financing).

81. As for targets, the 2006 programme for phase II would ensure:

- (a) National annual CTC consumption control target for 13 process agent applications will not exceed 6,945 ODP tonnes; and

- (b) National annual CTC consumption control target for process agent applications other than those in phase I and phase II will not exceed 14,300 ODP tonnes.

82. In 2006, a total of 9 CTC phase-out contracts have been signed, including five closure contracts with (CPP/CEVA) enterprises, two conversion contracts with two MIC enterprises, one closure contract with one buprofenzin enterprise and one retroactive financing contract for conversion with an imidacloprid enterprise, which completed CTC conversion in 2005. Two imidacloprid enterprises, Suhua Group and Hisun Chem, have dismantled their production lines and committed to stop using CTC. The Suhua Group, which produces oxidiazon and mefenacet and other products on a multi-functional production line will submit a commitment document to stop using CTC for this line and not to apply for funding. Another mefenacet producer, Changlong Chem., will also commit to converting the production to a non-ODS process at its own cost. SEPA will also not issue a CTC consumption quota for those applications.

83. Of the technical assistance activities planned in 2006, two are particularly interesting. The first one is a domestic investigation of new process agent consumers other than those covered by phase I and phase II. Beijing University of Chemical Technology (BUCT) has been selected to undertake this project. Of the 62 new process agent companies with CTC consumption in 2005, 46 were visited by the end of August 2006. The remaining companies would have been visited by September 2006. The purpose of the investigation is to clarify the number of applications and enterprises and the actual CTC consumption in 2005 for reporting back to the 50th Meeting of the Executive Committee as per the phase II Agreement.

84. The second one is a study of CTC consumption and emissions in the production of CPP/CEVA. As the Parties have not defined the emission control levels for process agent applications for Article 5 countries, it is not clear whether the 994 ODP tonnes of CTC reserved for these applications under phase II is technically feasible for the CPP/CEVA enterprises and if it will be accepted by the Parties. Therefore, the Chinese Government feels it is essential to study the details of CTC consumption and emissions in CPP/CEVA production. The terms of reference is under preparation. A consultant will be selected to perform the task.

85. The targets for 2007 annual programme remain the same as for those in 2006, which are explained in paragraph 5 above. To contain the consumption of CTC within the targets for the applications under phase II, another nine contracts will be signed in 2007 with consuming enterprises for closure, conversion, emission control and retroactive funding for those industries which have already completed their phase-out activities. Of the US \$10 million requested, US \$6 million will be allocated to CTC producers for reducing production, US \$3 million to CTC consuming enterprises, and US \$1 million for technical assistance activities. The 2007 annual programme presents the annual phase-out targets, policy actions, and technical assistance activities in tables 2, 3 and 4 with details on targets, expenditure level and key dates for completion.

86. The submission has three annexes: Annex I provides a list of CTC producers and their status; Annex II contains information on process agent enterprises under phase II which has four tables providing details on ODS consumption for each application between 2001-2005, the production lines of each application, the list of process agent enterprises in the sector plan, and CTC consumption for each sub-sector and enterprise; and Annex III covers a list of policies implemented.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

87. The World Bank's submission includes the following two clarifications for the annual programme:

- (a) Seven applications in Table A-bis of decision XVII/8 are considered by China as feedstock uses for non-ODS chemicals. These applications are No. 49, 57, 63, 64, 65, 66 and 67; and
- (b) In this annual programme, "new PA" refers to all CTC uses except those in phase I, phase II, lab uses and potential applications using CTC as feedstock (including the above-noted seven applications).

88. In response to the comments of the Secretariat, the World Bank confirmed that, until the Meeting of the Parties and TEAP reclassifies these seven applications as feedstock, China will treat them consistent with the other applications in Table A-bis under decision XVII/8. Otherwise, phase II of the sector plan has taken off the ground since its approval towards the end of 2005 on the momentum built up during phase I of the sector plan. The survey of the unknown CTC process agent applications is reportedly going well and the result is likely to be submitted to the 50th Meeting as per the request in the Agreement for phase II.

RECOMMENDATIONS

89. The Secretariat recommends that the Executive Committee approves the 2007 annual work programme with the understanding that:

- (a) The seven applications from Table A-bis under decision XII/8 of the Parties to the Montreal Protocol, which China has contested should be included in the national annual CTC consumption control target for process agent applications, other than those in phase I and phase II, which should not exceed 14,300 ODP tonnes per year for 2006 and 2007; and
- (b) The request for funding and support costs for the 2007 annual work programme will be submitted by the World Bank to the 51st Meeting together with a verification report on the implementation of the 2006 annual programme.

SECTOR PLAN FOR CFC PRODUCTION PHASE-OUT: 2007 ANNUAL PROGRAMME

PROJECT DESCRIPTION

Introduction

90. The World Bank is submitting to the 50th Meeting of the Executive Committee the request on behalf of the Government of China for the approval of the 2007 annual work programme of the Agreement for the China production sector. This is with the understanding that approval of funding of US \$24 million plus US \$1.8 million as support cost for the implementation for the 2007 programme will be requested at the first meeting of that year based on satisfactory performance of the programme in 2006, as per the Agreement. The 2007 work programme is not attached for reasons of economy but could be made available upon request.

Background

91. Since its approval by the Executive Committee in 1999, the China Production Sector Phase-Out Agreement has been successfully implemented between 1999 to 2006 to reduce the number of CFC-producing plants from 37 in 1999 to six in 2006, and the CFC production from 50,351 ODP tonnes in 1999 to 13,500 ODP tonnes in 2006 (to be verified in the beginning of 2007). It is expected that CFC production in China would be terminated by July 2007 with the implementation of the 2007 annual programme.

92. The table below sums up the key data of the China CFC production sector plan and those of the 2006 and 2007 work programmes.

Table 1

Country	Peoples Republic of China
Project title:	Sector Plan for CFC production phase-out in China
Year of plan	2007
# of years completed	8
# of years remaining under the plan	3
Ceiling for 2006 CFC production (in ODP tonnes)	13,500 ODP tonnes
Ceiling for 2007 CFC Production (in ODP tonnes)	7,400 ODP tonnes
Total funding approved in principle for the CFC sector plan	US \$150 million
Total funding released from MLF as of December 2006	US \$111 million
Total funding disbursed from World Bank to China (as of September 2006)	US \$91.5 million
Level of funding requested for 2007 Annual Plan	US \$24 million

Project description

93. The submission has two parts:

- (a) Part A is a summary report on the implementation by China of the Sector Phase-Out Agreement since its approval in 1999, including progress achieved in the implementation of the 2006 annual programme as of August 2006. The following are the most salient features of the summary report:
 - (i) Implementation of the China Production Sector Phase-Out Agreement between 1999 to 2005 has reduced the number of CFC-producing plants from 37 in 1999 to six in 2006, and CFC production from 50,351 ODP tonnes in 1999 to 13,500 ODP tonnes in 2006 (which will be verified at the beginning of 2007). The annual production each year has been confirmed by both a national audit of the annual programme conducted by the China National Audit Office and an international verification of the production commissioned by the World Bank. Starting from the 2004 annual programme, implementation of the CFC production closure programme began to establish linkages with other related sector plans under implementation in China. For instance the verification under this programme will provide monitoring of China's compliance on the production of CFC-13 according to the relevant Montreal Protocol control schedule. In 2005 the Government bought back 550 ODP tonnes of CFC-113 production quota and signed the contract to close and dismantle the only CFC-113 producing plant. Implementation of the 2006 annual programme continues to rely on a combination of administrative measures and tradable production quotas, because the reduced number of producers and continued market demand make it increasingly difficult to rely solely on voluntary production quotas to reduce CFC production. The Government will limit the CFC export to 400 ODP tonnes in 2006 as required in the agreement for the accelerated phase-out programme (APP). Annex I includes 12 tables which provide a brief history of the results of each of the seven annual programmes implemented to date covering names of enterprises, CFC type, capacity, production level and the status of the plant (closed or producing) in 2006. The result of implementing the 2006 programme will be verified by the World Bank and reported to the first meeting of the Executive Committee in 2007;
 - (ii) The progress report on the 2006 annual programme continues to list the policy controls that have been enacted by the Government of China, such as the circular on Implementing the Quota System for CFC Production issued by SEPA and the State Administration of Petroleum and Chemical Industry on 31 May 1999, the circular on Strengthening Management of ODS Import and Export issued in April 2000, and the circular on Control Mechanism of Import and Export of ODS promulgated in December 1999. Imports of CTC, a key feedstock for CFC production, were banned in April 2000. As an attempt to discourage illegal CFC production, the National Development and Reform Commission, the central planning authority has listed CFC production as an obsolete production technology

in 2004. This will prevent anyone planning to set up CFC production from obtaining bank loans or approval from local authorities. During 2006 the Government continued to implement the Regulation on Implementing Site Supervision to CFC Production Enterprises, issued by SEPA in December 2001. Under this regulation, technical professionals from the remaining CFC producers are designated by SEPA as supervisors to be placed in the plants of peer producers to carry out year-round on-site mutual monitoring. This has proved to be an effective monitoring mechanism; and

- (iii) An update is provided on the implementation of the technical assistance programme under which a total of 40 activities were initiated out of the 51 planned and 11 cancelled. One technical assistance programme which was started in 2006 was an attempt to develop a strategy to monitor and manage the increasing use of ODS as feedstock applications in China. Annex III includes eight tables according to annual work programmes, which present the information on each of the technical assistance activities planned, including title of the activity, implementing agency, contract date, completion date planned and status of implementation.
- (b) Part B of the World Bank's submission is a description of the components of the 2007 programme, which include policy actions, production reduction to be achieved by producing enterprises, and technical assistance activities. According to the accelerated phase-out programme (APP), China will not produce more than 7,400 ODP tonnes of CFCs by 1 July 2007 and will terminate CFC production after that, apart from the 550 ODP tonnes allowed each year between 2008-2009 for MDI production. China will also ensure that its CFC-13 production should not exceed 15 per cent of the baseline of 26.7 ODP tonnes by 1 January 2007.
- (i) Five total closure contracts are expected to be signed with five CFC producers by the end of May 2007. One partial closure contract will be signed with the only remaining CFC producer. The producer's quota will be limited to 550 ODP tonnes for MDI uses in 2008 and 2009. For the five total closure contracts, all CFCs remaining in the production system will be purged and accounted for in the quota calculation for the first half of 2007. All residue materials will be properly disposed of. All remaining CTC feedstock will be handled according to the CTC sales and consumption license system. All key equipment will be dismantled and destroyed. All the closure activities, including the preparation of the necessary documents and the completion report will be ready by the end of September 2007. The verification of the production in the first half of 2007 together with the verification of the complete closure of plants will be carried out in October 2007; and
 - (ii) In accordance with the Accelerated Phase-out Plan and the Refrigeration Service Sector Plan, a total of approximately 2,500 MT of CFC-11 and CFC-12 will be stockpiled for critical applications and the refrigeration service sector after production ceases.

94. The current policy framework will continue, especially the regulation of production quotas, which will be monitored by the on-site peer supervision of the producing plants. In addition, a number of bans for achieving the target of 2007 are prepared now and will be issued in the last four months of 2006 or the earlier part of 2007, which include:

- (a) The public notice of the ban for CFCs used in home appliances and the import and export of these CFC-based appliances will be issued in September or October 2006 jointly by five ministries (SEPA, NDRC, GAC, MOC, AQSIQ) and will be effective by 1 January 2007;
- (b) The ban on the consumption of CFC-11 in the tobacco sector will be issued and effective by 1 January 2007;
- (c) The ban on the production of CFCs except for MDI uses will be issued and effective by 1 July 2007; and
- (d) The ban on the consumption of CFCs in the foam sector will be issued and effective by 1 January 2008.

95. The submission of the World Bank includes an updated list of HCFC producing enterprises in China as per the Agreement. In 2005 there were three new HCFC plants added to the list, namely plants 16, 17, and 18, which brought the total number of HCFC producers to 18. In 2006, plant 2 changed its name from “Zhonghao New Chemical Materials Co. Ltd” to “Changshu 3F Zhonghao New Chemical Materials Co. Ltd” and plant 3 changed its name from “Jiangsu Changhu Elf Atochem 3F Co. Ltd to “ARAKEMA (Changshu) Fluorochemical Co. Ltd”.

96. US \$23 million out of the US \$24 million for implementation of the 2007 programme is currently planned for compensating the enterprises for closing and reducing CFC production and the remaining US \$1 million is planned for technical assistance although reallocation could happen once implementation starts.

SECRETARIAT’S COMMENTS AND RECOMMENDATIONS

COMMENTS

97. The 2007 annual work programme will complete the CFC production sector plan although there will be two more funding tranches to be disbursed. China will be allowed to produce up until 1 July 2007 a total of 7,400 ODP tonnes of CFCs and should then terminate all CFC production after that, except for 550 ODP tonnes each year in 2008 and 2009 reserved for MDIs. China should also ensure that its CFC-13 production complies with the control schedule of the Montreal Protocol by reducing production by 1 January 2007 to 15 per cent of the baseline.

98. The 2007 work programme proposes a series of actions that would make these targets achievable, such as the signing of the complete plant closure contracts no later than May 2007 with five of the remaining plants and limiting the validity of the quota to the first half of 2007. One CFC producer is expected to remain in production while the other five will be dismantled in

September 2007. All this will be verified by the World Bank in the second half of the year and reported to the Executive Committee in the context of the 2008 annual work programme.

99. A series of regulative measures are being planned by the Government to sustain the CFC production phase-out. But most important is the new regulation on ODS management, which is being proposed for endorsement by the State Council and which will be the tool to enforce and sustain the phase-out. The on-site supervision by peer CFC producers instituted by SEPA has proved to be an effective tool for monitoring CFC production and will continue in 2007.

RECOMMENDATIONS

100. The Secretariat recommends that the Executive Committee:

- (a) Requests that the production target for CFC-13 be separately listed within the overall CFC production limit for 2007 since it has a different control schedule under the Montreal Protocol;
- (b) Requests the World Bank to provide further details on the proposed scheme for controlling CFC exports for 2006 and 2007 through five CFC producers in the revised 2007 work programme to be submitted together with the verification of the 2006 annual work programme at the 51st Meeting; and
- (c) Approves the 2007 work programme of the China CFC production closure programme, noting that the request for funding and support costs will be submitted by the World Bank to the 51st Meeting together with a verification report on the implementation of the 2006 annual programme.

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS CHINA

PROJECT TITLE**BILATERAL/IMPLEMENTING AGENCY**

ODS phase-out in China solvent sector: 2007 annual programme	UNDP
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NATIONAL CO-ORDINATING AGENCY:

State Environmental Protection Administration (SEPA)

LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT**A: ARTICLE-7 DATA (ODP TONNES, 2005, AS OF OCTOBER 2006)**

CFC	-	CTC	-
TCA	-		

B: COUNTRY PROGRAMME SECTORAL DATA (ODP TONNES, 2005, AS OF OCTOBER 2006)

Substance	Aerosols	Foams	Refrigeration	Substance	Solvents	Process Agent	Fumigant
CFC-113					546.10		
TCA					186.59		
CTC					-		

CFC consumption remaining eligible for funding (ODP tonnes)

N/A

CURRENT YEAR BUSINESS PLAN: Total funding US \$5,891,000: total phase-out 169.3 ODP tonnes

PROJECT DATA		2000	2004	2005	2006	2007	2008	2009	2010	Total
CFC-113 (ODP tonnes)	Annual consumption limit		N/A	550	0	0	0	0	0	N/A
	Annual phase-out		N/A	550						N/A
TCA (ODP tonnes)	Annual consumption limit		N/A	424	339	254	169	85	0	N/A
	Annual phase-out		N/A	85	85	85	84	85	0	N/A
CTC (ODP tonnes)	Annual consumption limit		N/A	0	0	0	0	0	0	N/A
	Annual phase-out		N/A	0	0	0	0	0	0	N/A
TOTAL ODS CONSUMPTION TO BE PHASED OUT										
Annual CFC phase-out target in the Solvent Sector (ODP) tonnes			N/A	635	85	85	84	85	0	N/A
Final project costs (US \$):										
Funding for UNDP			31,345,000	5,680,000	5,055,000	5,480,000	1,480,000	1,480,000	1,480,000	52,000,000
Total project funding			31,345,000	5,680,000	5,055,000	5,480,000	1,480,000	1,480,000	1,480,000	52,000,000
Final support costs (US \$):										
Support cost for UNDP			2,851,750	426,000	379,125	411,000	111,000	111,000	111,000	4,400,875
Total support costs (US \$)			2,851,750	426,000	379,125	411,000	111,000	111,000	111,000	4,400,875
TOTAL COST TO MULTILATERAL FUND (US \$)			34,196,750	6,106,000	5,434,125	5,891,000	1,591,000	1,591,000	1,591,000	56,400,875
Final project cost effectiveness (US \$/kg)										

FUNDING REQUEST: Approval of funding for the eight tranche (2007) as indicated above.**SECRETARIAT'S RECOMMENDATION**

Blanket approval

**PROGRESS REPORT ON IMPLEMENTATION OF THE SOLVENT SECTOR PLAN
FOR ODS PHASE-OUT IN CHINA FOR 2005/2006, 2007 ANNUAL
IMPLEMENTATION PROGRAMME AND REQUEST
FOR FUNDING OF THE EIGHT TRANCHE**

PROJECT DESCRIPTION

101. On behalf of the Government of China, UNDP has submitted to the 50th Meeting of the Executive Committee the 2006 annual progress report and annual implementation programme for 2007 for the solvent sector plan for ODS phase-out in China. Funding for the 2007 annual implementation programme of US \$5,480,000 plus support costs of US \$411,000 is requested. This funding is included in UNDP's 2006 business plan.

Background

102. The solvent sector plan for China was approved in principle at the 30th Meeting at a total cost of US \$52 million plus support costs for UNDP. Funds totalling US \$45,736,875 (including support costs) have been approved for the first seven annual tranches from 2000 to 2006 inclusive.

103. The phase-out is being achieved through a combination of investment activities targeting specific enterprises and a technical assistance programme for smaller enterprises managed through a voucher system. Consumption limits are being maintained through regulation of production and imports. The reductions in production are controlled under China's production sector phase-out plans for CFCs and CTC. The use of CTC as a cleaning solvent has been prohibited since 1 June 2003 and the use of CFC-113 as a solvent was prohibited on 1 January 2006 onwards. The only ODS solvent with remaining consumption is methyl chloroform (1,1,1 TCA) which, under the plan, will be completely phased out by 1 January 2010.

Phase-out from investment projects and activities

104. SEPA and UNDP continued to implement enterprise-level phase-out activities through ODS reduction contracts initiated between 2003 and 2005, through retroactive reimbursement and through agreements for gradual self-phase-out as well as activities for smaller enterprises under a voucher system initiated in 2003.

105. Phase-out is complete for all 2001 and 2002 ODS reduction contracts. Two contracts are pending national acceptance and payment. Verification was undertaken by sampling 30 per cent of the enterprises.

106. Twelve enterprises that signed reduction contracts in 2004 submitted project completion reports in 2005 for complete phase-out of 87.79 ODP tonnes of CFC-113 and 2.15 ODP tonnes of TCA. However, differences between reported and verified consumption were identified at the first three enterprises verified in 2006. SEPA is now requiring independent verification of all twelve enterprises prior to reimbursement. This will be completed in 2006.

107. Phase II of the voucher system, initiated in 2004, also uses a reimbursement mechanism. A total of 225 enterprises are continuing with the project for a total phase-out of 610 ODP tonnes of CFC-113 and 27.8 ODP tonnes of TCA. A sample of 34 enterprises was audited to confirm

the reported consumption and achievement of phase-out. Project completion reports were expected in September 2006 and the national acceptance procedure is planned for completion in November 2006.

108. Contracts for procurement of equipment for 20 enterprises manufacturing liquid crystal displays were issued in September 2005 and all equipment has now been delivered, installed and tested. National acceptance procedures will be conducted before the end of 2006.

109. In view of the ban on use of CFC-113 as of January 2006, the final group of retroactive reimbursement contracts was initiated with 26 enterprises, for a potential phase-out of 340 ODP tonnes of CFC-113. Applications were required to be submitted by 14 September. An independent accounting company will verify the qualification requirements and completion of phase-out. National acceptance will be conducted by the end of 2006.

110. Action was initiated in 2006 to extend the retroactive reimbursement programme to users of TCA. Following awareness activities to attract participation, by early September enterprises with a total consumption of 10.4 ODP tonnes had applied. Total consumption of 30 ODP tonnes is predicted by the application deadline of 30 September 2006. Contracts are planned for signature in November 2006 with completion of conversion in mid-2008.

111. A summary of progress with phase-out through investment activities is indicated in Table 3 of UNDP's project submission, as reproduced below:

Table 3: Phase-out achieved through 2000 – 2006 ODS reduction contracts, voucher system, and retroactive reimbursement and self-phase-out mechanisms

			CFC-113 (ODP T.)	TCA (ODP T.)	CTC (ODP T.)	No. of Enterprises	Funding (US \$1,000)
2000	Contracts for future phase-out	Planned	372.8	10	0	10 – 20	5,000
		Signed	378.4	10.1	8.36	16	4,132
	Phase-out achieved	On-going projects	-	7.4	-		
	TOTAL 2000 PHASE-OUT		-	7.4	-		
2001	Contracts for future phase-out	Planned	524	10	0	10 – 20	5,505
		Signed	541.6	10.6	0	21	4,361
	Phase-out achieved	On-going projects	54.1	-			
		2000 contracts	340.1	9.8	8.36		
	TOTAL 2001 PHASE-OUT		394.2	9.8	8.36		
2002	Contracts for future phase-out	Planned	500	25	55	20 – 40	5,830
		Signed	535.8	43.2	17.94	32	4,004
	Phase-out achieved	On-going projects	291.3	41.7			
		2000 contracts	38.4	0.4	-		
		2001 contracts	-	-			
		TOTAL 2002 PHASE-OUT		329.7	42.1	-	
	2003	Activities for future phase-out	Planned	600	78	55	120-140
Signed			417.7	19.1	0	87	5,100
Phase-out achieved		On-going projects	-	-	-		
		2001 contracts	336.3	7.3			
		2002 contracts	-	-	-		
		2003 activities *	142.1	37.9			
	TOTAL 2003 PHASE-OUT		478.4	45.2	-		

			CFC-113 (ODP T.)	TCA (ODP T.)	CTC (ODP T.)	No. of Enterprises	Funding (US \$1,000)
2004	Activities for future phase-out	Planned	550	78	0-		4,000
		Identified	737.8	54		302	4,729
	Phase-out achieved	2001 contracts	205.3	3.3			
		2002 activities*	108.6	18.3	16.5		
		2003 activities	-	-			
		2004 activities*	49.4	9.8			
	TOTAL 2004 PHASE-OUT		363.3	31.4	16.5		
2005	Activities for future phase-out	Planned	550	85	0		4,280
		Identified	156.7				4,200
	Phase out Achieved	2002 activities *	427.2	24.9	1.44		
		2003 activities	463.8	36.7	0		
		2004 activities	256.4	11.9			
	TOTAL 2005 PHASE-OUT		1,147.4	73.5	1.44		
2006	Activities for future phase-out	Planned	(360)	(30)	0		3,340
		Identified	340+	10.5+	0	40	3,222
	Phase-out achieved	2003 activities	21.7	-27.2			
		2004 activities	(254.2)	(5.3)			
		2005 activities	(156.7)				
		2006 activities	(300)	(5)			
	TOTAL 2006 PHASE-OUT*		(732.6)	-17			
Seven Year Cumulative Total	Phase-out planned		3,456.80	316	110		
	Phase-out targets		3,300	367	110		
	Phase-out achieved by completion of on-going projects and signed contracts		3,108	167	26.3		
	ACTUAL PHASE-OUT ACHIEVED		(3,445.6)	(192.4)	26.3		

* From retroactive reimbursement and gradual self-phase-out activities

+ phase-out achieved as of September 2006

Figures in brackets () indicate anticipated phase-out as of December 2006

112. Consistent with advice in previous reports, China and UNDP have indicated that the difference between the planned and actual phase-out is due to:

- (a) Delays in recording phase-out which has actually occurred until all administrative procedures necessary to declare a project complete have been undertaken;
- (b) Gradual phase-out during implementation, prior to project completion, which results in national level reductions in consumption being greater than the recorded enterprise level phase-out.

Policy measures

113. In June 2002, SEPA announced rules establishing ODS solvent consumption certificates, which imposed controls on ODS consumption on the basis of ODS supply and demand. In March 2003, SEPA issued a nationwide ban on use of CTC as solvents as of 1 June 2003. On 7 December 2004, SEPA issued a nationwide ban on the use of CFC-113 as a solvent to take effect from 1 January 2006.

114. In September 2006, SEPA/FECO announced regulations for a quota and licensing system for TCA production, consumption and distribution. Enterprises will be required to apply for licenses during October each year. FECO will control the total quantities to be produced and

consumed and will release quotas as appropriate between 1 November and 30 December each year.

Technical assistance activities

Essential solvent uses

115. A final report of the technical assistance activity entitled “Strategy and Study on Essential Usage of ODS” by the College of Environmental Science of Peking University was commenced in April 2004 was issued in March 2006. The report indicates that essential use exists primarily in enterprises consuming solvents in the manufacture of products for the military sector.

Illegal ODS activities

116. The cooperative project to address emerging illegal production consumption and import/export undertaken by SEPA’s Bureau of Environmental Supervision established in May 2004 has been working effectively since its inception. Six cases of illegal ODS production were revealed in 2006. The management system for monitoring illegal ODS production, consumption and trade underwent national acceptance in July 2005.

117. An emergency response mechanism to investigate illegal ODS activity has been established in several key provinces/cities. In 2006 two workshops were conducted on combating illegal ODS activities. A total of 208 trainees participated. Related material was added into the national training programme for inspection officers. Thirty-one sets of ODS detection equipment were purchased and distributed for nationwide use.

118. In order to release data in a timely manner on ODS production, consumption, trade, import and export, to carry out statistical work and analysis, and to effectively reveal and combat illegal ODS related activities, SEPA/FECO has established an on-line system for trade licenses. Assessment of the project will be undertaken before the end of 2006.

119. To complement the on-going project to combat ODS related illegal activities an additional technical assistance project was commenced to improve the capacity of China’s customs authorities, including procurement of detection equipment, training for key customs supervision staff and investigation of illegal activities.

Ozone friendly provinces/cities demonstration project

120. Twelve provinces/cities signed agreements in October 2005 to implement legislative and administrative actions to complete the phase-out of chlorofluorocarbons and halons by June 2006. The 12 provinces/cities have met the target. Assessment of the associated phase-out activities commenced in August 2006 and is expected to be completed before the end of this year.

121. During the phase-out period SEPA held three coordinating meetings and sent a research group to Europe and the United States to investigate and research policies on phase-out and reclamation of CFCs and halons in developed countries. In addition, under this sub-project, six issues of the periodical “News Briefing on Accelerating the Phase-out of ODS, Establishing

Ozone Friendly Provinces/Cities” were published and a column was developed for the website www.ozone.org.cn.

Research programme on TCA substitutes and technology in the solvent sector

122. In view of the need to encourage industries to participate in the TCA phase-out programme, in August 2006 an independent research institution was contracted to identify specialized substitutes for TCA and to identify alternative technologies that can be applied effectively to each individual industry.

Public awareness and training

123. To facilitate and promote TCA phase-out activities in 2006, 25 media outlets were selected in partnership with FECO to publicize the phase out project and to promote the notice of participation across the country. The website <http://solvent.ozone.org.cn> was initiated in July 2006, from which detailed information about the project and related application forms can be downloaded.

124. To overcome deficiencies in reporting and verification of consumption, training will be given to participating enterprises in October 2006 on verification of consumption, requirements for project management, the implementation process, the performance audit and research on substitutes.

125. FECO officials now attended industrial association seminars to encourage enterprises to participate in phase-out activities. The association approach is becoming more and more helpful in the implementation of the projects and has produced positive results.

Verification of 2005 ODS consumption limits

126. The 2005 national consumption of CFC-113, TCA and CTC is presented in Table 4 of the report, reproduced below:

Table 4: ODS solvent consumption for the year 2004 (ODP tonnes)

	CFC-113 (ODP tonnes)	TCA (ODP tonnes)	CTC (ODP tonnes)
Consumption control target	550	424	0
Production	549.304	77.883	-
Import	-	108.708	-
Export	-	-	-
Solvent consumption	549.304	186.591	0

127. Consistent with the verification process in previous years, UNDP included the China solvent sector plan project in its regular annual management and financial audit undertaken in 2006 by the National Audit Office of the People’s Republic of China (CNAO). The audit was conducted in conformity with the provisions of the project document, international auditing standards, relevant Chinese auditing standards and the principles and procedures prescribed for

the United Nations with respect to funds obtained from or through UNDP. The audit included examination of accounting records, tests of internal control systems and other procedures considered necessary for due performance of this audit.

National level consumption

128. The audit confirmed that official government import and export data indicate nil imports or exports of CFC-113 in 2005. Based on the World Bank's production sector verification report for 2005, the total consumption of CFC-113 was found to be below the 2005 consumption control target of 550 ODP tonnes.

129. According to the data reported by the producers and the 2006 report of CNAO Foreign Loan & Financial Aids Projects Audit Centre No 43, TCA production in 2005 was 77.883 ODP tonnes. According to information from the General Administration of Customs and the Administration Office of ODS Import and Export, import of TCA in 2005 was 108.708 ODP tonnes. Therefore, the total consumption of TCA is 186.591 ODP tonnes, which meets the control target of 424 ODP tonnes set out in the Agreement, while consumption of CTC used as a solvent has also been verified as zero.

Enterprise-level consumption

130. SEPA and UNDP commissioned an independent accounting firm, Beijing Zhong Tian Hua Zheng Certified Public Accountants Co. Ltd., to undertake a performance verification at 41 recipient enterprises under the 2005 annual implementation programme as well as the technical assistance activities undertaken under the solvent sector phase-out plan and the national consumption limits, through verification of TCA production, import and export quantities of CFC-113 and TCA. As recommended in decision 42/13, a careful selection process was carried out to ensure that the 41 enterprises constituted a representative sample.

131. The verified CFC-113 consumption of the enterprises was substantially lower than the consumption reported by the enterprises in the original contracts. However it was confirmed that by June 30th, 2006, 39 of the 41 enterprises had ceased ODS solvent consumption. Several enterprises failed to provide documents proving the disposal of the old ODS equipment, due to inappropriate management.

132. The verification found that enterprises participating in the retroactive reimbursement project had relatively strong accounting and management systems and production procedures. Several of those participating in the voucher system phase II did not have satisfactory management and accounting systems, but appeared capable of carrying out and completing their projects.

Policy enforcement

133. The audit concluded that the verification process found no non-compliance with the SEPA ban on the use of CTC for solvent purposes first promulgated on 1 June 2003.

Audit recommendations

134. To overcome a lack of clear understanding of the requirements of phase-out projects, it is suggested that intermediate executing agencies (IEAs) and the participating enterprises should be trained in advance.

135. Inconsistency between invoice consumption figures and actual enterprise consumption amount is not rare. Therefore, it is recommended that verification of the amount phased out should be based on a number of relevant indicators, not only the invoice amount.

136. Pre-training of the intermediate executing agencies is necessary to guarantee the quality and progress of the phase-out programmes.

137. Lack of awareness of the project at national level, including the bans on use and the overall phase-out schedule, had led to hesitation and suspicion about the project. More activities are needed to promote public awareness and to ensure the effectiveness of implementation.

Unspent balances from previous tranches

138. The total funding released by the Executive Committee, the amount of fund disbursed or committed by the implementing agencies and the unspent balance from fund released, as of 31 December 2005 are indicated in the table below.

Total Amount Approved (US \$)	Amount Disbursed / Committed (US \$)	Uncommitted / Undisbursed Balance (US \$)	Year of Commitment of Unspent Balance
42,080,000	20,534,485	21,545,515	2006-2008

139. The above does not include US \$9 million targeted to be disbursed in 2006.

140. FECO/SEPA and UNDP decided that vigorous pre-disbursement scrutiny is needed to verify the levels of consumption and the authenticity of procurement and contractual services. Additionally, the retroactive payment is further delayed until the verification process is completed. These are the two main factors contributing to the large uncommitted balance.

141. FECO/SEPA is also keen to ensure that such savings not be programmed at this stage, but are saved to cover any unforeseen expenditures later in the project and to ensure sufficient funding to cover all beneficiaries.

The 2007 annual implementation programme

142. The 2007 Annual Implementation Programme will continue to implement and complete the phase-out activities initiated in 2005 and 2006. New activities will be initiated to phase out 85 ODP tonnes of TCA, contributing to the achievement of 2007 consumption control limits. For 2007, phase-out activities at the enterprises level will be achieved through direct phase-out and the retroactive reimbursement mechanism. To ensure that phase-out activities initiated in 2006 can be completed by the end of 2008, activities will commence early in 2007.

143. Necessary technical assistance activities, legislative measures, monitoring and enforcement mechanisms are also included in the 2007 Annual Implementation Programme.

Such activities are now becoming more important in terms of sustaining phase-out of CTC and CFC-113.

144. The technical assistance activities and Government actions proposed in 2007 are indicated in the following tables:

Technical assistance activities in the 2007 AIP

Activity		Description
Public awareness	Objective	Introduce and publicize nationwide ODS phase-out in solvent sector to attract attention and participation maintaining and updating solvent website
	Target group	Solvent consumers in both formal and informal enterprises
	Outcome	Public awareness and interest in participation increased
Workshops for TCA substitute and alternative technology	Objective	Introduce alternative technologies and TCA substitutes
	Target group	Recipient enterprises, EIAs and administrations
	Outcome	Enterprises being assisted on possible TCA substitutes, foundation of future work being established
Training on TCA new phase-out project, alternative technologies and implementation mechanism	Objective	Address inquiries on project procedures
	Target group	TCA consumption enterprises that participate in the ODS Reduction Project
	Outcome	Promotion of enterprises' understanding of MP, MLF procedures, requirements of the project and performance verification. Preliminary selection of alternative technologies.
Compilation of a collection of successful and proved TCA substitute technologies	Objective	Gathering the experience of TCA users successful in phasing out of TCA and suggestions from experts to guide the TCA consumption enterprises for technology substitution
	Target group	Target TCA users and recipient TCA users
	Outcome	Knowledge gained by enterprises on substitute technologies
Continuation of the TCA substitute and alternative technology project	Objective	Find the most effective substitutes for TCA in most of the TCA consumption fields
	Target group	TCA consumption enterprises that have signed contracts with SEPA
	Outcome	TCA consumption enterprises being guided from the research results to select most appropriate ODS alternative technology
Continuation of the programme against illegal import, production and consumption of ODS	Objective	Ensure effective monitoring and enforcement on ODS usage, selection of appropriate and effective technologies, clear understanding of MLF procedures, ensure workplace and worker safety recipient
	Target group	Local EPB, customs authorities and AQSIQ
	Outcome	Effective mechanism established to tackle illegal ODS related cases
Supervision and monitoring of the phase-out project	Objective	Ensure successful implementation of ODS phase-out project and verify the qualification of the enterprise
	Target group	Recipient enterprises and potential enterprises who have applied phase out project and will sign contract with SEPA
	Outcome	Every enterprise will meet the project's requirements both in qualification and consumption and executive procedures
Performance verification	Objective	Verify the performance of ODS phase-out activities at both national and enterprise level in the year of 2006 by an independent entity
	Target group	National consumption and industry consumption of ODS solvents
	Outcome	Assessment of the performance of ODS phase-out at both national and enterprise level
Implementation of TCA quota & licenses system (training, workshop and supervision)	Objective	Through training and supervision, control and reduce TCA in production, distribution and consumption
	Target group	TCA producer, distributors and consumers
	Outcome	Information obtained on production, distribution and consumption of TCA and control measures applied
Policy training for local authorities in China	Objective	Establish and promote the on line training system and continue to conduct face to fact training to local governments
	Target group	Officials from local EPBs, customs and supervision departments
	Outcome	Improvement in capacity of policy enforcement with regard to ozone protection

Government actions in the 2007 AIP

Policy/Activity Planned	Schedule of Implementation
Monitoring of CTC and CFC-113 solvent ban	Throughout the year
Continue to implement regulation on management of TCA through quota and license system to control production, distribution and consumption of TCA	Throughout the year
Promulgate bans on production and consumption of TCA in 2010	End of 2007
Public awareness	Throughout the year
Continue identification and monitoring of enterprises who have undertaken phase-out at their own initiatives, verify phase-out and implement reimbursement of phase-out costs	Activities will be continued and emphasis will be raised in 2007
Continue identification of enterprises that choose to undertake gradual phase-out, finalize agreement, verify annual phase-out and monitor issuance of usage certification	

2007 Budget

145. The total amount requested for the 2006 annual implementation programme is US \$5,480,000 plus support costs of US \$411,000 for UNDP. Prior to 2005, funding was requested at the first meeting of the year. However, commencing with the 2006 tranche, UNDP and China now request approval of funding at the last meeting of the preceding year. UNDP indicated that funding for the additional tranche for the 2006 AIP was included in its 2005 business plan approved at the 48th Meeting. The breakdown of expenditure is indicated below:

Activity	Planned Expenditures (US \$)
Enterprise-level phase-out activities -Retroactive reimbursement and gradual self phase-out mechanism	4,391,000
Technical assistance - Public awareness (US \$130,000) - Workshop on TCA substitutes (US \$50,000) - Training on TCA new phase-out project (US \$80,000) - Compilation of a collection of TCA substitute technologies (US \$50,000) - Programme against illegal trades (cooperation with AQSIQ) (US \$200,000) - Supervision and monitoring of the phase-out project (\$100,000) - Implementation of TCA quota & licenses system (\$150,000) - Performance verification (\$100,000) - Policy training for local authorities in China (US \$129,000) - International and national technical experts (US \$100,000)	1,089,000
TOTAL	5,480,000

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

146. Compliance with the consumption limits specified in the sector plans agreement is dependent firstly on the level of production of CFC-113 in China. This amount is verified as part of production sector phase-out plans. The other relevant factors are TCA production and imports and exports of TCA and CFC-113. The audit of these quantities confirms that the production and import and export figures held by the ODS Import and Export Control Office jointly set up by SEPA, the Ministry of Commerce and the General Administration of Customs were accurately

reported in project documentation. Consistent with practice in previous years, the verification audit process does not extend to examination of the origin of the figures held by the Import and Export Control Office. On the basis of the information provided, China has met the CFC-113 and TCA control measures contained in the agreement for the solvent sector phase-out plan.

147. It has been reported that, consistent with the requirements of the agreement there was nil consumption of CTC for solvent uses in 2005. The verification report indicated that through investigation, no non-compliance was discovered. UNDP subsequently advised that to ensure sustainability of the phase-out in CTC for solvent use, the terms of reference of the performance verification include undertaking spot checks of previously identified CTC solvent consumers, to confirm the non-existence of such illegal consumption. Similar activities will be carried out to detect illegal use of CFC-113 as of 1 January 2006, however such random checks can only be carried out in a limited scope due to the availability of resources to undertake such investigations.

148. The Secretariat sought clarifications concerning the measures that had been taken to implement decision 42/13 (b) concerning the focussing of audit and verification activities at the national level in combined missions of national and international experts, and the establishment of an effective monitoring system to prevent diversion of CTC for solvent use.

149. UNDP indicated China's view that emphasis should be placed on the enforcement of the regulations and preventive actions through technical assistance activities to combat illegal ODS activities, which have a wider scope than the China solvent sector phase-out plan alone. Future actions under the China solvent sector phase-out plan may include allocation of additional resources to combat illegal ODS activities and to strengthen capacities to enforce the regulations.

150. UNDP further added that specific actions to combat illegal ODS activities to control unofficial import currently in progress through the technical assistance programme include:

- (a) A SEPA 'hotline' and website for reporting illegal production, consumption and trade of ODS;
- (b) A cooperative investigation mechanism between FECO and the Bureau of Environmental Supervision (BES) of SEPA;
- (c) Under this mechanism, six cases of illegal ODS production were revealed in 2006;
- (d) An emergency response mechanism established by BES in several key provinces/cities in collaboration with local Government authorities;
- (e) The second technical assistance project for combating illegal trade to train customs authorities and provide ODS detecting instruments; and
- (f) Provisions for strict punishment under related laws including fines, closure and dismantling of equipment.

151. As occurred with the previous annual report, the original proposal from UNDP did not include information on the use of CTC as a feedstock at the plant level as required in clause (c) of the agreement. UNDP subsequently provided the required data which indicated that a total of

485 ODP tonnes of CTC was used as a process agent for the uses approved as process agents at the time the agreement was concluded. This conforms to the limit of 5,500 ODP tonnes specified in the agreement.

152. In regard to phase-out performance, consistent with previous reports, the verification exercise undertaken at the enterprise level indicate that the uptake of phase-out projects by industry does not provide phase-out quantities equal to the total reductions in consumption at the national level. It also indicates that there are still challenges to be overcome in both attracting enterprises to participate in the funded phase-out programme and in administering the programme itself. However the verification report findings and the proposed actions of SEPA and UNDP also indicate that the issues raised in the verification report are being actively addressed.

153. It is clear that a great deal of effort is being directed towards attracting enterprises to participate in funded phase-out activities. It is also evident from UNDP's report that particular emphasis is being placed on ensuring that funds are being administered in an appropriate manner and that enterprise claims are fully verified prior to disbursement of funds. This extends the time required for disbursement. However it appears to be time well spent and provides an assurance that Fund resources are being properly applied.

154. Following a request for clarification of financial obligations and disbursements, UNDP provided the following additional details on use of approved funds and targets for disbursement of the 2007 tranche:

Funding Released by Executive Committee (US \$)	Value of Contracts Signed (US \$)	Funds Disbursed as of December 2005 (US \$)	Funds Committed but not disbursed (US \$)	Year and Amount of Payment of Undisbursed Amount (US \$)	Balance Undisbursed or Uncommitted (US \$)
Previous Tranches					
37,025,000	34,320,698	18,914,114	15,406,584		2,704,302
Investment Activities	31,270,343	17,238,517	14,031,826	\$5,572,215 (2006) \$7,608,392 (2007) \$851,219 Savings	
Non-Investment Activities	3,050,355	1,675,597	1,374,758	1,330,210 (2006) 44,548 (2007)	
2006 AIP					
5,055,000	4,049,302	n/a	4,049,302		1,005,698
Investment Activities	2,069,070	n/a	2,069,070	582,529 (2006) 1,486,541 (2007)	
Non-Investment Activities	1,980,232	n/a	1,980,232	1,740,582 (2007) 239,650 savings	
Total					
42,080,000	38,370,000	18,914,114	19,455,886		\$3,710,000

155. UNDP indicated that contracts with a value of US \$38.37 million had been entered into by the end of September 2006. However because the contracts have been signed by SEPA, and not by UNDP, they cannot be recorded in UNDP's financial record, even as obligations, until disbursement by SEPA has taken place. The low disbursements reported by UNDP are due in large part to the time that elapses between the contracting of an activity by SEPA and the recording of financial obligation and disbursement in the UNDP financial system. While there is an uncommitted balance of US \$3.7 million, plus about US \$1 million in savings, it is estimated that the total amount of contracts signed will be approximately \$42 million by the end of 2006, leaving only US \$80,000 uncommitted out of the total approved funding of \$42,080,000.

156. There are no issues arising from the proposed 2007 annual implementation plan.

RECOMMENDATIONS

157. The Fund Secretariat recommends that the Executive Committee notes the report from the Government of China and UNDP on the implementation of the solvent sector plan for ODS phase-out in China for 2005/2006 and verification of 2005 performance. The Fund Secretariat also recommends blanket approval of the 2007 annual implementation plan for the solvent sector in China and funding for the eighth tranche of the project with associated support costs at the level shown in the table below:

	Project Title	Project Funding (US \$)	Support Cost (US \$)	Implementing Agency
	ODS phase-out in China solvent sector: 2007 annual programme	5,480,000	411,000	UNDP

Sector Plan for Phaseout of CFCs Consumption in China Pharmaceutical Aerosol Sector

**State Environmental Protection Administration
State Food and Drug Administration
and
National Institute for the Control of Pharmaceutical and
Biological Products
August 4, 2006**

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Summary

This sector plan aims to assist China to phase out CFCs consumption in its pharmaceutical aerosol sector excluding MDIs applications. The funding request targets the consumption of 485.089 ODP MT CFCs. The sector plan was prepared on the basis of a detailed analysis of eligible aerosol applications in China. It proposes conversion to non-ODS substitute aerosol where mature substitutes are available. Before new non-CFCs production starts, manufacturers are allowed to use stockpiled CFCs to maintain production to meet clinical demand. The sector plan will be implemented through two biennial programs starting in 2007. The sector plan includes policy actions to ensure that the phase-out proceeds on schedule. An action plan indicating annual CFC phase-out targets is included in the proposal and the first biennial program for 2007-2008 is submitted along with this sector plan.

Pharmaceutical Aerosol Manufacturers:	39
Eligible Manufacturers:	32
Applications by Eligible Manufacturers:	24 Skin Aerosol Applications 16 Cavity Aerosol Applications
CFCs Baseline Consumption(Average of 2003-2005):	485.089 ODP MT
ow. CFCs Consumption Requested for MLF Grant:	464.355 ODP MT
Project Duration:	4 years
Project Incremental Cost:	US\$15.927 million
Requested MLF Funding:	US\$ 15.927 million
IA Support Cost	US\$ 1,195 million
Total cost to the MLF	US\$ 17.122 million
Cost Effectiveness:	US\$ 32.83/kg ODP
National Coordinating Agency:	SFDA and SEPA

CHAPTER 1 Introduction

1. Background

1. The Government of China ratified the Montreal Protocol on Substances that Deplete the Ozone Layer in 1991 and finalized China Country Program for Ozone Depleting Substances Phase-out in January 1993. This Country Program was submitted to the 9th Executive Committee (ExCom) of the Multilateral Fund of the Montreal Protocol in March 1993 and was updated by China in November 1999. From 1997 to 2006, several phase-out sector plans have been developed and implemented, reaffirming China's commitment to meeting its obligations for phase-out of ODS consumption with the support of MLF.
2. Funding of US\$ 135,000 was approved at the 43rd ExCom meeting in July 2004 to prepare *the Sector Plan for Phase-out of CFCs Consumption in China Pharmaceutical Aerosol Sector (non-MDIs)*. As the leading agency for the implementation of Montreal Protocol, the State Environmental Protection Administration of China (SEPA), in cooperation with the State Food and Drug Administration (SFDA), selected National Institute for the Control of Pharmaceutical and Biological Products (NICBP) to prepare this sector plan.

2. Objectives

3. The main objectives of this sector plan include the following:
 - a Identify all CFCs-based pharmaceutical aerosol manufacturers, their aerosol applications and CFCs consumption;
 - b Design a technical scheme for phaseout of CFCs consumption in China pharmaceutical aerosol sector based on available non-ODS substitutes;
 - c Develop a CFCs Phaseout Action Plan to meet the requirement of *China Accelerated Phase-out Plan(APP)*;
 - d Request MLF funding consistent with the MLF policies and guidelines to phase out CFCs in the sector¹;
 - e Develop new CFCs phase-out policies for pharmaceutical aerosol sector; and
 - f Develop a monitoring and management system to ensure successful implementation of the CFC phase-out in the pharmaceutical aerosol sector and rational utilization of MLF funds.

CHAPTER 2 Sector Profile

1. Background

4. China pharmaceutical aerosol industry started fairly late. In 1964, Shanghai Institute of Pharmaceutical Industry, in cooperation with Shanghai Sine Pharmaceuticals Factory, Wuxi First Pharmaceuticals Factory and Chongqing Seventh Pharmaceuticals Factory, developed and produced Pingchuan (Anti-asthmatic), the first aerosol product in China. The period from 1964 to the 1980s saw comparatively slow development of China pharmaceutical aerosol sector due to the bottleneck of development of containers, valves and metered-dosed charging equipment. However, after those problems were solved, great progress has been achieved in the sector.

2. Sector Survey

¹ As substitute technology was not available in 1990s, it is proposed that the cutting off date should be July 1, 1999 after which Article 5 Parties had the obligation to freeze CFCs production and consumption (see paragraph 45).

5. NICBPB was selected to carry out the sector survey and to prepare the sector plan for China pharmaceutical aerosol sector. The survey covered both non-MDIs and MDIs pharmaceutical aerosol manufacturers. To collect data, an investigation questionnaire was jointly prepared by SFDA, SEPA and NICBPB.
6. In June 2004, SFDA sent the questionnaire to pharmaceutical aerosol manufacturers in China. By November 2004, SFDA had received feedback from 57 enterprises.
7. In August 2004, SEPA, NICBPB and SFDA verified three aerosol manufacturers by site visit, namely, S&P Pharmaceutical Industry Co. Ltd., Xinjiang Biochemical Pharmaceutical Co. and Xinjiang Pharmaceutical Factory.
8. In September 2005, SFDA and NICBPB visited 40 pharmaceutical aerosol manufacturers to collect data.
9. In March 2006, SFDA requested again that its provincial Food and Drug Administration Bureaus confirm the list of aerosol manufacturers and their aerosol products.
10. In April 2006, pharmaceutical manufacturers were invited to attend a meeting in Beijing to learn the CFCs phaseout for the sector. At the meeting, they confirmed their data of aerosol products. The meeting also provided information on the process for phasing out CFC and the requirements for new registrations of aerosol products.
11. In April 2006, NICBPB visited eight pharmaceutical manufacturers. Therefore, total 51 manufacturers have been investigated by site visit. For the other 11 manufacturers without aerosol production, NICBPB had collected by sending questionnaires their relevant information including product approval numbers. So total 62 pharmaceutical aerosol manufacturers were investigated. It is confirmed by NICBPB that the survey covered all the CFCs-based non-MDIs pharmaceutical aerosol manufacturers.
12. The sector survey indicates that Chinese pharmaceutical aerosol manufacturers only have conceptual ideas on the CFCs substitutes and conversion technology.

3. Sector Profile

13. Pharmaceutical aerosol product comprises the propellant compatible with the drug, a container capable of withstanding vapor pressure of propellant and a valve system. Propellants used in China pharmaceutical aerosol sector are mainly CFCs including CFC-11 and CFC-12. CFC-11 is used as a dispersant while CFC-12 as a propellant. Containers are made of glass, aluminum, stainless steel and plastic, but glass and aluminum containers are more often seen. Valves are often made of plastic, rubber, aluminum and stainless steel. Valves have to be inert with formulations in the canisters.
14. Pharmaceutical aerosols can be grouped by dispersing system into three types, namely, solution type, suspension type and emulsion type. China pharmaceutical aerosols can also be divided by medical usage into three groups – i) aerosol absorbed through skin (Skin Aerosol hereinafter), which is also called as external-use aerosol in China. ii) aerosol absorbed through cavity and mucosa, e.g. oral, nasal and vaginal cavity (Cavity Aerosol hereinafter) and iii) aerosol inhaled through respiratory tract (MDIs). The first two groups are referred to as non-MDIs aerosols, which are addressed in this sector plan. China will submit another sector plan for MDIs sector separately at a later stage. Table 2-1 is the survey summary of the non-MDIs sector.

Table 2-1 Summary of China Pharmaceutical Aerosol Sector

	Eligible for MLF Grant*	Not Eligible for MLF Grant	Total
CFCs Baseline Consumption (MT)	464.355	20.733	485.089
Number of Manufacturers	32	7	39

Number of Production Lines	35	6	41
Number of Production Lines with Baseline Consumption	22	5	27
Number of Skin Aerosol Applications	24	3	-
Number of Cavity Aerosol Applications	16	4	-
Number of Skin Aerosol Products	42	3	45
Number of Cavity Aerosol Products	21	4	25

* Aerosol manufacturers with production lines established before cutting-off date (July 1, 1999).

3.1 Aerosol Applications

15. **Skin Aerosol Applications.** Skin Aerosols are used for wound surface protection, cleaning, sterilization, topical anesthesia and homeostasis etc. They are requested to have no stimulation effect. The surface coverage (thin film) provided by those aerosols should have good permeability. SFDA has issued 51 drug production approval numbers (i.e. drug specifications), relating to 25 applications (see table 2-2). Out of the 25 applications, 10 are chemicals applications which are as same as those in foreign countries; 15 are Traditional Chinese Medicine (TCM) Applications, of which 12 are proprietary applications owned by Chinese manufacturers. There are total 30 manufacturers with registration numbers for Skin Aerosol products.
16. **Cavity Aerosol Applications.** SFDA has issued 24 registration approval numbers for Cavity Aerosols, relating to 19 applications (see table 2-2), among which 8 are chemicals applications and 11 TCM applications. There are four nasal aerosol applications, mainly peptides and protein drugs, which exert general action, obviate gastrointestinal and hepatic first-pass action and improve bioavailability. There are two vaginal aerosol applications, mainly with tropical therapy for virginities and with contraception purpose. There are 13 oral aerosol applications, mainly with local action for the treatment of pharyngitis. Total 18 pharmaceutical manufacturers have registration numbers for cavity aerosol products.

Table 2-2 China Pharmaceutical Aerosol Applications

Application ID	Application Name	CFCs Baseline (kg)	Number of Manufact.	Manufacturer Name(#ID)
1) Skin Aerosol Application (total 25 applications)				
A02	Ice Cape Jasmine Distress Aerosol	19,053	1	Guizhou Antai Pharmaceutical Co., Ltd (#20)
A08	Compound Salicylic Acid and Clotrimazol Aerosol	1,773	1	Guizhou Antai Pharmaceutical Co., Ltd (#20)
A09	Compound ethyl chloride aerosol	0	1	Guangzhou Baiyunshan Hejigong Pharmaceutical Co., Ltd (#03)
A10	Compound Chlorobutanol Aerosol	717	2	Wuxi Shanhe Group No.1 Pharmaceutical Co., Ltd. (#01); Chongqing Kerui Pharmaceutical Co., Ltd. (#25)
A11	Compound Methyl Salicylate and Diphenhydramine Aerosol	0	2	Zhanjiang Xintongde Pharmaceutical Co., Ltd. (#27), Nantong Zhongbao Pharmaceutical Co., Ltd. (#37)
A13	Compound Cape jasmine Aerosol	229	1	Guizhou Xinyi Pharmaceutical Corporation (#21)
A14	Compound lithospermi aerosol	6	1	Suizhou Pharmaceutical Co. Ltd of Wuhan Jianmin Group (#19)
A16	Haobai Damp Impairment Aerosol	1,412	2	Hunan Bencao Pharmaceutical Co., Ltd. (#16); Shanghai Yishengyuan Pharmaceutical Co., Ltd. (#32)
A17	Hongyao Aerosol	57,717	1	Shenyang Jingcheng Pharmaceutical Co., Ltd. (#14)
A19	Keshangtong Aerosol	7	1	Suizhou Pharmaceutical Co. Ltd of Wuhan Jianmin Group (#19)
A22	Dolicaine chlorhexidine aerosol	833	2	South shaolin Pharmaceutical Co., Ltd in Fujian. (#09);

Application ID	Application Name	CFCs Baseline (kg)	Number of Manufact.	Manufacturer Name(#ID)
				Zhanjiang Xintongde Pharmaceutical Co., Ltd. (#27)
A23	Dolicaine chlorhexidine aerosol	35,616	10	Wuxi Shanhe Group No.1 Pharmaceutical Co., Ltd. (#01); Guangdong Baiyunshan Hejigong Pharmaceutical Co., Ltd. (#03); Guangdong Baiyunshan Externally Applied Agent Factory (#04); Penglai Nuokang Pharmaceutical Co., Ltd. (#11); Shandong Jingwei Pharmaceutical Co., Ltd. (#18); Hangzhou Sino-US huadong Pharmaceutical Co., Ltd. (#22); Zhanjiang Xingtongde Pharmaceutical Co., Ltd. (#27); Heilongjiang Tianlong Pharmaceutical Co., Ltd. (#28); Nantong Zhongbao Pharmaceutical Co., Ltd. (#37); Anshan No.1 Pharmaceutical Factory (#39);
A24	Lidocaine aerosol	0	1	Sine Pharmaceutical Factory of Shanghai Pharmaceutical Group Co., Ltd. (#08)
A25	Molsidomine Aerosol	0	6	Beijing Haiderun Pharmaceutical Co., Ltd. (#02); Beijing Double-Crane Modern Pharmaceutical Technology Co., Ltd. (#06); Sine Pharmaceutical Factory of Shanghai Pharmaceutical Group Co., Ltd. (#08); Harbin Hengchang Pharmaceutical Co., Ltd. (#15); Heilongjiang Tianlong Pharmaceutical Co., Ltd. (#28); Harbin Guangji Pharmaceutical Factory. (#36);
A27	Ruxiang Rheumatism Aerosol	0	1	Zhanjiang Xingtongde Pharmaceutical Co., Ltd. (#27)
A28	Shangle Aerosol	0	1	Beijing Haiderun Pharmaceutical Co., Ltd. (#02)
A29	Huoxianqutong Aerosol	49,530	3	Hubei Nanyang Pharmaceutical Co., Ltd. (#13); Heilongjiang Tianlong Pharmaceutical Co., Ltd. (#28); Hubei Lishizhen Medical Group Co., Ltd. (#34)
A30	Shiyang Aerosol	0	1	Beijing Haiderun Pharmaceutical Co., Ltd. (#02)
A32	Diclofenac Sodium Aerosol	5,583	1	Zhanjiang Xingtongde Pharmaceutical Co., Ltd. (#27)
A33	Methyl Salicylate aerosol	9,851	1	Fujian Nanshaolin Pharmaceutical Co., Ltd. (#09)
A35	Sunshangxuxiaozhitong Aerosol	0	1	Beijing Tongrentang Technology Development Corporation. (#07)
A36	Wanjinxiang Aerosol	38	1	Guizhou Hongyu Pharmaceutical Co., Ltd. (#29)
A37	Xiangbingqutong Aerosol	13	1	S & P Pharmaceutical Industry Co., Ltd. (#30)
A42	Lidocaine Hydrochloride Aerosol	0	1	Shanghai Fuxingzhaohui Pharmaceutical Co., Ltd. (#10)
A45	Yunnan Baiyao Aerosol	273,334	1	Yunnan Baiyao Group Corporation. (#24);
	S ubtotal	455,712		
2) Cavity Aerosols Application (total 19 applications)				
A01	Bao Fu Kang foam	1,193	1	Guizhou Hongyu Pharmaceutical Co., Ltd. (#29)
A03	Beclometasone Tubinaire (Beconase)	20,390	1	Glaxo SmithKline (Tianjin) Pharmaceutical Co., Ltd. (#12)
A04	Beclometasone Aerosol	0	1	Guangzhou Dongkang Pharmaceutical Co., Ltd. (#31)
A05	Xanthiun and Magnolia flower Aerosol	2,592	1	Xinjiang Biochemistry Pharmaceutical Co., Ltd. (#23)
A06	Fluconazol Aerosol	0	1	Sine Pharmaceutical Factory of Shanghai Pharmaceutical Group Co., Ltd. (#08)
A07	Fudekang foam	13	1	Guiyang Dechangxiang Pharmaceutical Co., Ltd. (#05)

Application ID	Application Name	CFCs Baseline (kg)	Number of Manufact.	Manufacturer Name(#ID)
A12	Compound Chlorobutanol Aerosol	0	1	Chongqing Kerui Pharmaceutical Co., ltd.(#25)
A15	Isoconeazole Nitrate Aerosol	0	1	Heilongjiang Tianlong Pharmaceutical Co., Ltd. (#28)
A18	Jinlan aerosol	0	1	Anshan No.1 Pharmaceutical Factory. (#39)
A20	Stomatitis spraying agent	48	1	Shannxi Fengwuchendayaotang Pharmaceutical Factory Co., Ltd. (#35)
A21	Huanxiong Aerosol	0	2	Beijing Tongrentang Technology Development Corporation. (07); Anshan No.1 Pharmaceutical Factory. (#39)
A26	Qiweiqingyan Aerosol	293	1	Shandong Bencao Pharmaceutical Co., Ltd. (#17)
A31	Shuanghuanglian Aerosol	145	1	Sanjing Pharmaceutical Co., Ltd of Harbin Pharmaceutical Group. (#33)
A34	Suxiaojiuxin Aerosol	14	1	Beijing Tongrentang Technology Development Corporation.(#07)
A38	Nitroglycerin Aerosol	528	4	Shandong Jewim Pharmaceutical Co., Ltd. (#18); Zhanjiang Xintongde Pharmaceutical Co., Ltd. (#27); Xian Lisheng Pharmaceutical Co., Ltd.(#38); Shandong Bencao Pharmaceutical Co., Ltd.(#17)
A39	Isosorbide Dinitrate Aerosol	3	1	Shandong Jewim Pharmaceutical Co., Ltd.(#18)
A40	econazole nitrate aerosol	3,780	3	Guangzhou Baiyunshan Hejigong Pharmaceutical Co., Ltd.(#03), Zhanjiang Xingtongde Pharmaceutical Co., Ltd. (#27); Heilongjiang Tianlong Pharmaceutical Co., Ltd. (#28)
A41	Rapid recovery of throat aerosol	380	1	Huayi Pharmaceutical Co., Ltd. (#26)
A44	Yinhuangpingchuan Aerosol	0	1	Anshan No.1 Pharmaceutical Factory (#39)
	Subtotal	29,377		
	Total	485,089		

Table 2-3 Overviews of Pharmaceutical Aerosol Manufacturers

ID	Name of Enterprise	Chinese Share (%)	Lines	Date of Line.	Cap. (can/hour)	CFCs Baseline (kg)	Baseline CFCs for SA ¹ (kg)	Baseline CFCs for CA ¹ (kg)	Total Prod. Quantity ² (can)	SA Prod. Quantity (can)	CA Prod. Quantity (can)	SA App. ID	CA App. ID
01	Wuxi Shanhe Group No.1 Pharmaceutical Co., Ltd	100%	2	1965	2000	823	823	0	26,667	26,667	0	A10, A23	-
02	Beijing Haiderun Pharmaceutical Co., Ltd	100%	2	1978	-	0	0	0	0	0	0	A25, A28, A30	-
03	Guangzhou Baiyunshan Hejigong Pharmaceutical Co., Ltd	100%	1	1983	-	0	0	0	0	0	0	A09 A23	A40
04	Externally Applied Agent Factory of Guangzhou Baiyunshan Pharmaceutical Co., Ltd	100%	1	1959	-	0	0	0	0	0	0	A23	-
05	Guiyang Dechangxiang Pharmaceutical Co., Ltd	100%	1	1979	600	13	0	13	100	0	100	-	A07
06	Beijing Double-Crane Modern Pharmaceutical Technology Co., Ltd	100%	1	1980	-	0	0	0	0	0	0	A25	-
07	Beijing Tongrentang Technology Development Corporation	100%	1	1981	1800-3600	14	0	14	1,267	0	1,267	A35	A21,A34
08	Xinyi Pharmaceutical General Factory of Shanghai Pharmaceutical Group Co., Ltd	100%	1	1969	0	0	0	0	0	0	0	A24,A25	A06
09	Fujian Nanshaolin Pharmaceutical Co., Ltd	100%	1	1985	3000	10,684	10,684	0	48,571	48,571	0	A22, A33	-
10	Shanghai Fuxingzhaohui Pharmaceutical Co., Ltd	100%	1	1988	-	0	0	0	0	0	0	A42	-
11	Penglai Nuokang Pharmaceutical Co., Ltd	100%	1	1986	2000	3,491	3,491	0	100,600	100,600	0	A23	-
13	Hubei Nanyang Pharmaceutical Co., Ltd	70%	1	1991	1000	49,393	49,393	0	1,171,333	1,171,333	0	A29	-
14	Shenyang Jingcheng Pharmaceutical Co., Ltd	50%	1	1992	2000	57,717	57,717	0	968,533	968,533	0	A17	-
15	Harbin Hengchang Pharmaceutical Co., Ltd	100%	1	1992	-	0	0	0	0	0	0	A25	-
16	Pharmaceutical Factory of Hunan Bencao pharmacy Co., Ltd	100%	1	1993	800-1000	1,300	1,300	0	58,333	58,333	0	A16	-
17	Shandong Bencao Pharmaceutical Co., Ltd	100%	1	1997	1500	428	0	428	56,720	0	56,720	-	A26,A38
18	Shandong Jewim Pharmaceutical Co., Ltd BlueBox	100%	1	1993	500-600	12,080	11,685	395	318,281	276,314	41,967	A23	A38,A39
19	Suizhou Pharmaceutical Co. Ltd of Wuhan Jianmin Group	100%	1	1993	2000	13	13	0	700	700	0	A14, A19	-
20	Guizhou Antai Pharmaceutical Co.,	100%	1	1983	500-600	20,827	20,827	0	580,000	580,000	0	A02, A08	-

ID	Name of Enterprise	Chinese Share (%)	Lines	Date of Line.	Cap. (can/hour)	CFCs Baseline (kg)	Baseline CFCs for SA ¹ (kg)	Baseline CFCs for CA ¹ (kg)	Total Prodt. Quantity ² (can)	SA Prodt. Quantity (can)	CA Prodt. Quantity (can)	SA App. ID	CA App. ID
	Ltd												
21	Guizhou Xinyi Pharmaceutical Corporation	100%	1	1993	500-600	229	229	0	8,333	8,333	0	A13	-
22	Hangzhou Sino-US Huadong Pharmaceutical Co., Ltd	75%	1	1993	-	0	0	0	0	0	0	A23	-
23	Xinjiang Biochemistry Pharmaceutical Co., Ltd	100%	1	1994	2500	2,592	0	2592	50,000	0	50,000	-	A05
24	Yunnan Baiyao Group Corporation	100%	1	1995	5000	273,333	273,333	0	5,306,667	5,306,667	0	A45	
25	Chongqing Kerui Pharmaceutical Co., Ltd	100%	1	1975	-	0	0	0	0	0	0	A10	A12
26	Huayi Pharmaceutical Co., Ltd	100%	1	1996	500	380	0	380	70,000	0	70,000	-	A41
27	Zhanjiang Xintongde Pharmaceutical Co., Ltd	100%	1	1987	3600	29,397	25,917	3,480	1,240,000	1,036,667	203,333	A11, A22, A23, A27, A32,	A38, A40
28	Heilongjiang Tianlong Pharmaceutical Co., Ltd	100%	2	1996	1500-2000	300	0	300	33,333	0	33,333	A23, A25, A29	A15, A40
29	Guizhou Hongyu Pharmaceutical Co., Ltd	100%	1	1998	1500	1,230	38	1,193	76,933	2,800	74,133	A36	A01
31	Guangzhou Dongkang Pharmaceutical Co., Ltd.	100%	1	1987	-	0	0	0	0	0	0	-	A04
32	Shanghai Yishengyuan Pharmaceutical Co., Ltd	100%	1	1983	600-800	112	112	0	4,845	4,845	0	A16	-
37	Nantong Zhongbao Pharmaceutical Co., Ltd	100%	1	1990	-	0	0	0	0	0	0	A11, A23	-
39	Anshan No.1 Pharmaceutical Factory	100%	1	1990	-	0	0	0	0	0	0	A23	A18, A21, A44
30	Sanpu Pharmaceutical Co., Ltd	100%	0	2002	-	13	13	0	1,700	1,700	0	A37	-
33	Sanjing Pharmaceutical Co., Ltd of Harbin Pharmaceutical Group	100%	1	2003	1200	145	0	145	15,210	0	15,210	-	A31
34	Hubei Lishizhen Medical Group Co., Ltd	100%	1	2004	100	137	137	0	86,667	86,667	0	A29	-
35	Shannxi Fengwuchendayaotang Pharmaceutical Factory Co., Ltd	100%	1	2003	1800	48	0	48	6,000	0	6,000	-	A20
36	Harbin Guangji Pharmaceutical Factory	100%	1	NA	-	0	0	0	0	0	0	A25	-
38	Xian Lisheng Pharmaceutical Co., Ltd	100%	1	NA	-	0	0	0	0	0	0	-	A38
12	Glaxo SmithKline (Tianjin) Pharmaceutical Co., Ltd	0%	1	1991	1300-2000	20,390	0	20,390	1,216,000	0	1,216,000	-	A03
	Total		41			485,089	455,712	29,377	11,446,793	9,678,730	1,768,063		
	Eligible for MLF Fund		35			464,355	455,561	8,794	10,121,216	9,590,363	530,853		

ID	Name of Enterprise	Chinese Share (%)	Lines	Date of Line.	Cap. (can/hour)	CFCs Baseline (kg)	Baseline CFCs for SA ¹ (kg)	Baseline CFCs for CA ¹ (kg)	Total Prodt. Quantity ² (can)	SA Prodt. Quantity (can)	CA Prodt. Quantity (can)	SA App. ID	CA App. ID
	Not Eligible for MLF Fund		6			20,733	150	20,583	1,325,577	88,367	1,237,210		

1: SA: Skin Aerosol, CA: Cavity Aerosol; 2: Production quantity of baseline year.(average of 2003-2005).

3.2. CFCs Historical Consumption and Forecast for Future CFCs Consumption.

3.2.1. CFCs Consumption for Skin Aerosol

17. Table 2-4 shows the annual CFCs consumption data from 1996 to 2005 for Skin Aerosol. Baseline consumption is based on the average CFCs consumption of 2003 to 2005.

Table 2-4 CFCs Consumption for Skin Aerosol (1996-2005)

Year	CFC-11 Consumption (kg)	CFC-12 Consumption (kg)	Total (kg)
1996	30,519	117,596	148,116
1997	32,274	145,891	178,166
1998	33,834	133,219	167,054
1999	31,884	148,851	180,736
2000	43,007	165,436	208,443
2001	90,215	236,591	326,807
2002	124,551	296,296	420,847
2003	127,041	342,803	469,844
2004	97,120	347,122	444,242
2005	97,940	355,109	453,049
Baseline Level Average of 03-05	107,367	348,345	455,712

Chart 2-1 Annual CFC-11 Consumption for Skin Aerosol (1996-2005)

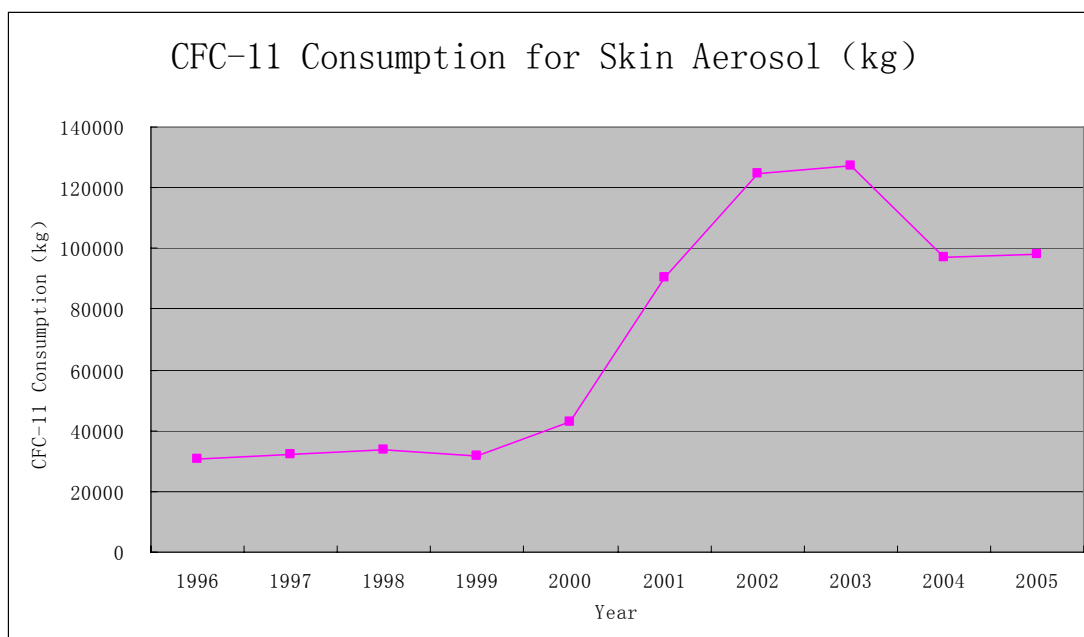


Chart 2-2 Annual CFC-12 Consumption for Skin Aerosol (1996-2005)

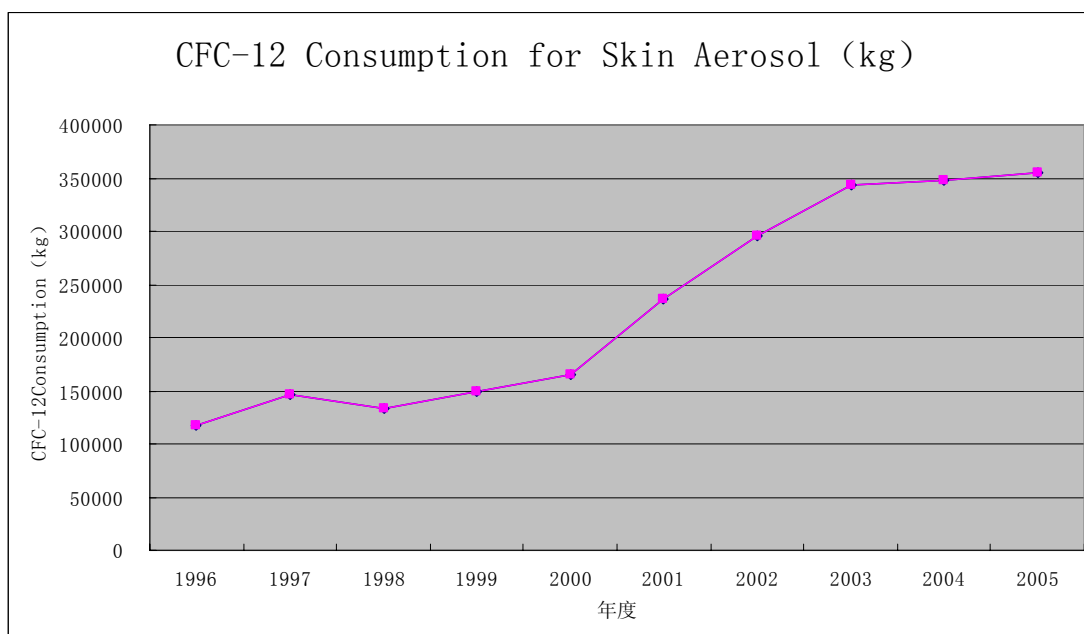
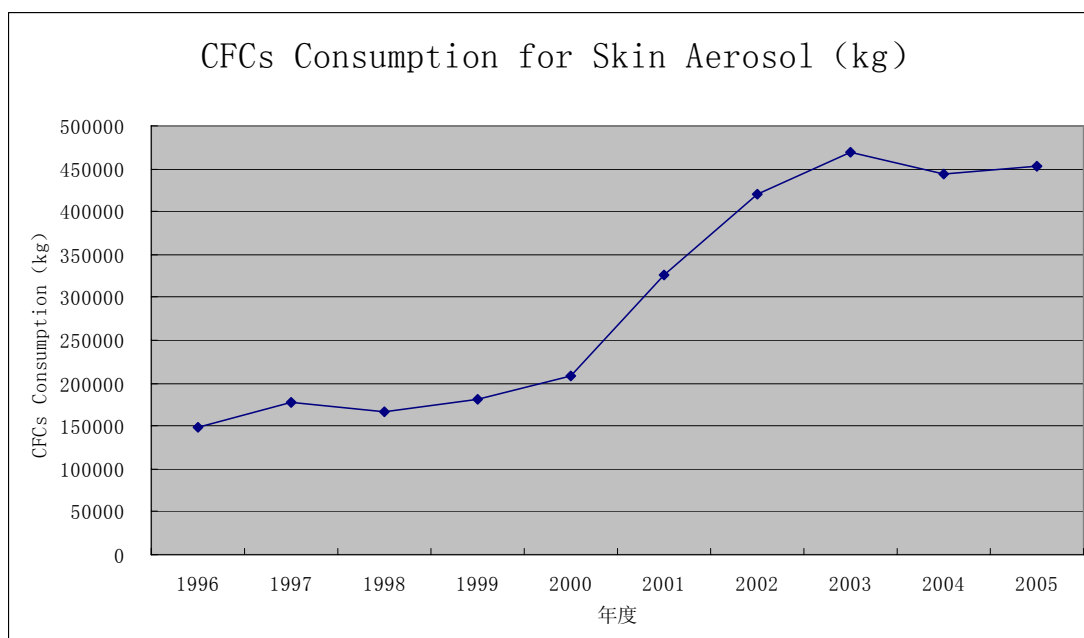


Chart 2-3 Aggregated Annual CFCs Consumption for Skin Aerosol (1996-2005)



3.2.2. CFCs Consumption for Cavity Aerosol

18. Table 2-5 shows annual CFCs consumption for Cavity Aerosol from 1996 to 2005. Baseline Consumption is based on the average CFCs consumption of 2003- 2005.

Table 2-5 CFCs Consumption for Cavity Skin Aerosol (1996-2005)

Year	CFC-11 Consumption (kg)	CFC-12 Consumption (kg)	Total (kg)
1996	1,137	2,924	4,061
1997	550	1,445	1,995
1998	1,614	6,125	7,739
1999	2,285	9,926	12,211
2000	2,058	9,881	11,939
2001	2,909	13,210	16,119
2002	1,867	10,425	12,292
2003	3,826	20,437	24,263
2004	8,228	32,471	40,699
2005	4,015	19,155	23,170
Baseline Level (average of 03-05)	5,356	24,021	29,377

Chart 2-4 CFC-11 Consumption for Cavity Aerosol (1996-2005)

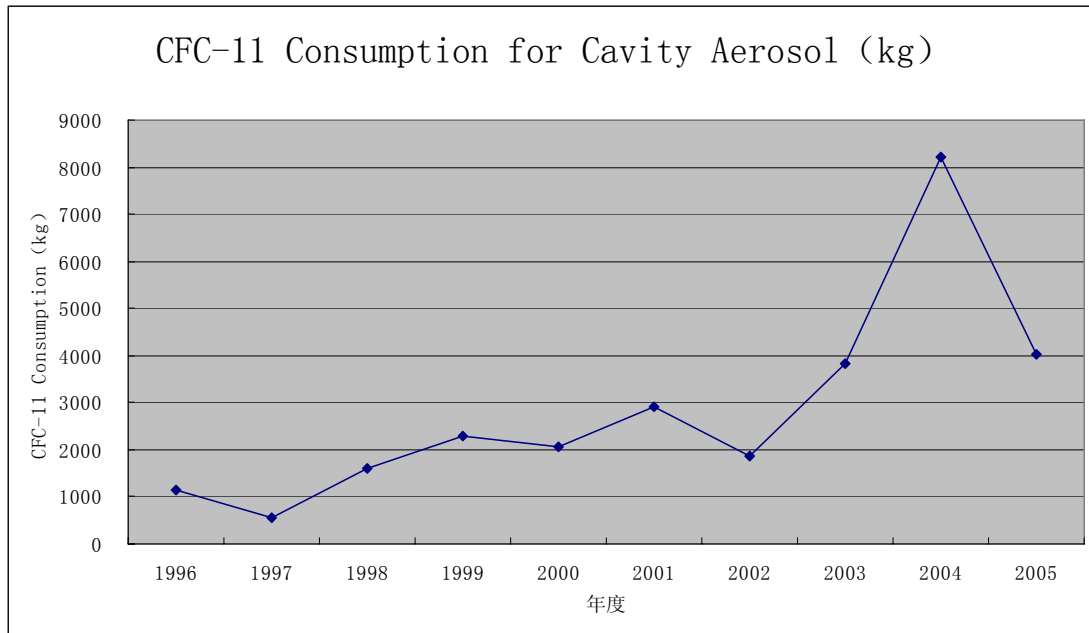


Chart 2-5 CFC-12 Consumption for Cavity Aerosol (1996-2005)

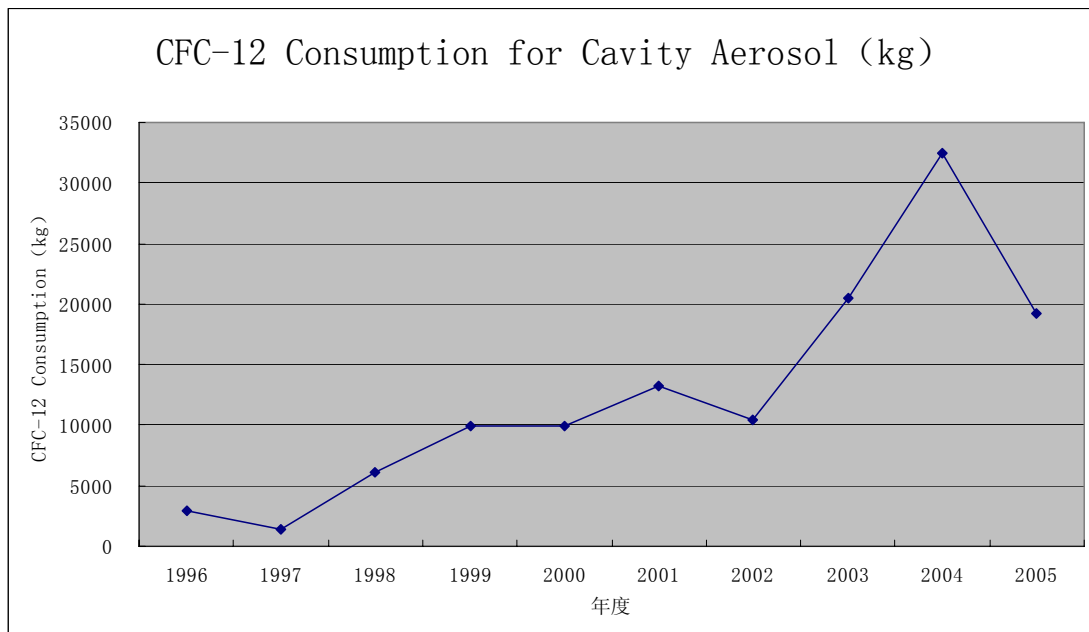
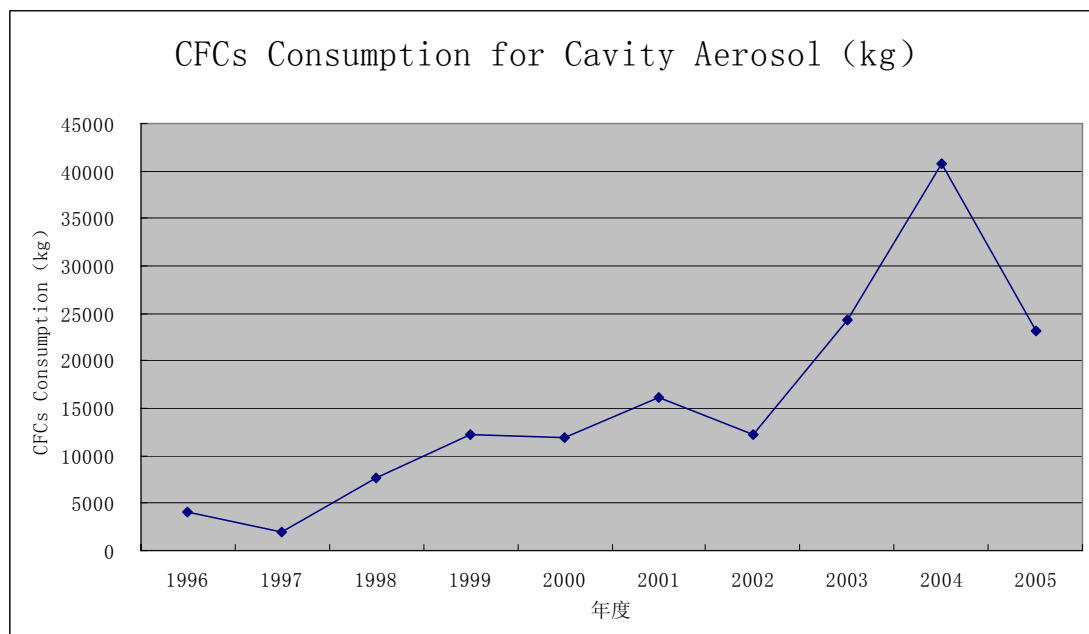


Chart 2-6 Aggregated Annual CFCs Consumption for Cavity Aerosol (1996-2005)



3.2.3. Forecast for CFCs Demand.

a) CFCs Demand Prediction for Skin Aerosol

19. CFCs consumption for Skin Aerosol increased from 1996 to 2005. Predicted by the tendency linear equation below, CFCs consumption for Skin Aerosol would reach at 700 tons in 2010.

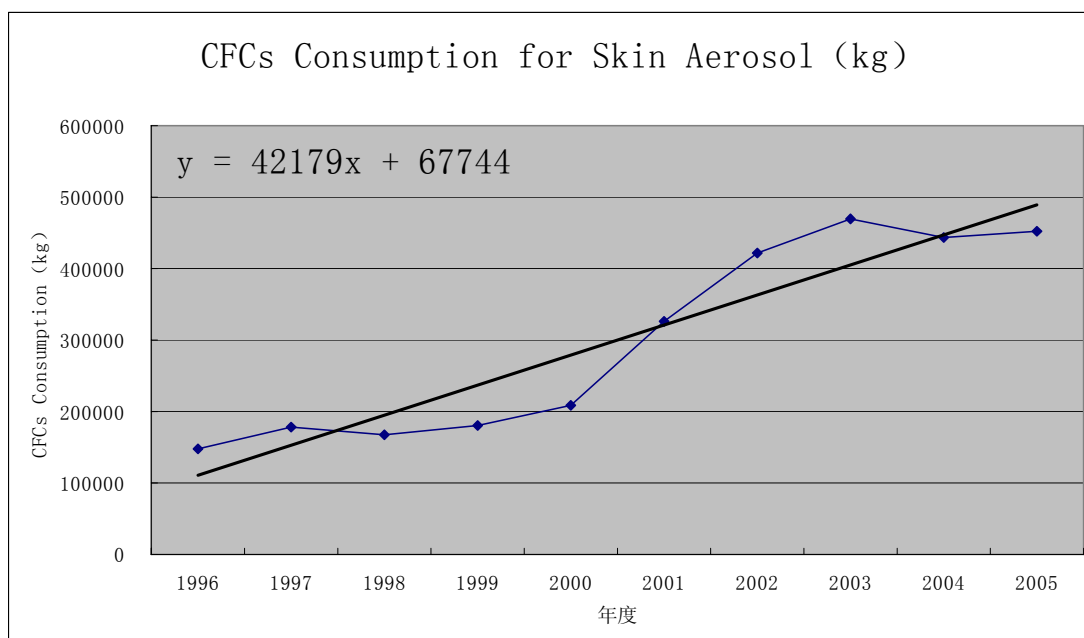
$$Y=42179X+67744$$

Where

X: The certain year minus 1995

Y: Annual CFCs consumption at a certain year;

Chart 2-7 Tendency Linear Equation for CFCs Demand Prediction for Skin Aerosol



b) CFCs Demand Prediction for Cavity Aerosol

20. CFCs consumption for Cavity Aerosol increased from 1996 to 2005. Predicted by the tendency linearity equation below, CFCs consumption for Cavity Aerosol would be about 37 tons in 2010.

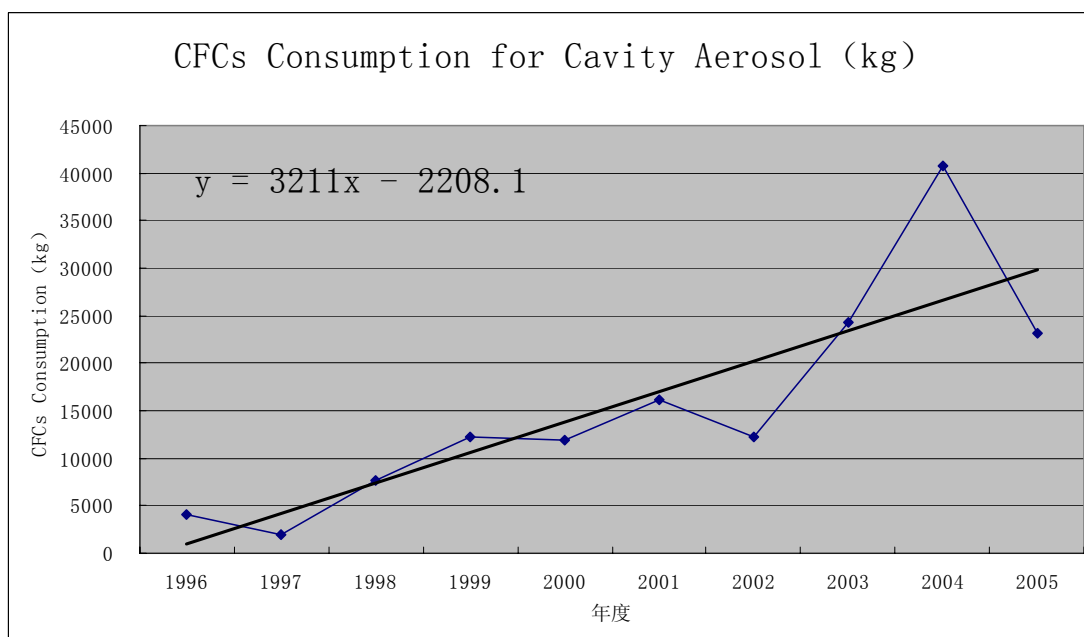
$$Y = 3211X - 2208.1$$

Where

X : The certain year minus 1995

Y : Annual CFCs consumption at a certain year;

Chart 2-8 Tendency Linear Equation for CFCs Demand Prediction for Cavity Aerosol



CHAPTER 3 Sector Policies

21. **Existing Policies** CFCs are used as excipients for pharmaceutical aerosol products. Replacement of CFCs with non-CFCs excipients or with different dosage form is subject to Chinese relevant laws, regulations and policies which mainly include the following:

1. Drug Administration Law of the People's Republic of China (effective since December 1, 2001)

22. This Law is enacted to strengthen drug administration, to ensure drug quality and safety for human beings, to protect the health of people and their legitimate rights and interests in the use of drugs. Article 2 of this law stipulates that all institutions and individuals engaged in research, production, distribution, use, or drug administration in the People's Republic of China shall abide by this Law. Some clauses related to the pharmaceutical aerosol sector plan include, but not limited to:
23. **Control over Manufacturers.** Article 9 states that “drug manufacturers shall conduct production according to the Good Manufacturing Practice for Pharmaceutical Products (GMP) formulated by the drug regulatory department under the State Council on the basis of this Law. The drug regulatory department shall inspect a drug manufacturer as to its compliance with the GMP requirements and issue a certificate to the manufacturer passing the inspection. The specific measures and schedule for implementing the GMP shall be formulated by the drug regulatory department under the State Council.”
24. **Control over Drugs.** Article 29 states that the dossier on a new drug research and development including the manufacturing process, quality specifications, results of pharmacological and toxicological study, and the related data and the samples shall, in accordance with the regulations of the drug regulatory department under the State Council, be truthfully submitted to the said department for approval, before clinical trial is conducted. Measures for verifying the qualifications of clinical study institutions for drugs shall be formulated jointly by the drug regulatory department and the administrative department for health under the State Council. When a new drug has gone through clinical trials and passed the evaluation, a New Drug Certificate shall be issued upon approval by the drug regulatory department under the State Council.
25. Article 31 states that “A drug manufacturer may produce the drug only after an approval number is granted to it.”

2. Provisions on Drug Registration issued by SFDA (No. 17, effective since May 1, 2005)

26. Article 8 states that “a new drug application means a registration application for a drug that has not been marketed in China. A drug that has been marketed in China for which an application is made for a change in dosage form, or route of administration of medicaments, add new indication shall be treated as a new drug application.”
27. “Application for a drug already with national standards means application for production of a drug for which SFDA has already issued formal standards. Supplemental application means an application for the change, addition, or cancellation of any item or contents in the existing registration approval of a new drug, drug already with national standards, or import drug.”

3. Notice of Stopping Using Chlorofluorocarbons (CFCs) as Excipients for Pharmaceutical Aerosol issued by SFDA on June 22, 2006. In order to cooperate with China Accelerated Phaseout Plan - to stop CFCs production by June 30, 2007 - SFDA issued the following policy. As per this notice,

28. (i) China is to stop using CFCs as excipients for external-use aerosol production since July 1, 2007. CFCs-based external-use aerosols products in storage are allowed to be circulated and used until the

expiration of their validity periods. China is to stop using CFCs as excipients for MDIs aerosol production since January 1, 2010. CFCs-based MDIs aerosols products in storage are allowed to be circulated and used until the expiration of their validity periods. SFDA will introduce special provisions for the transitional period from July 2007 to December 2009(see Chapter 5).

29. (ii) China is to stop importing CFCs-based external-use aerosols since July 1, 2007. CFCs-based external use aerosol products imported before this date are allowed to be circulated and used until the expiration of their validity periods. China is to stop importing CFCs-based MDIs aerosol since January 1, 2010. CFCs-based MDIs aerosol products imported before this date are allowed to be circulated and used until the expiration of their validity periods.
30. (iii) China is to stop approval of registration for external-use aerosols with CFCs as excipients from July 1, 2007 (including application for the imported CFC-based external use aerosol products). China is to stop approval of registration for MDIs aerosol products with CFCs as excipients (including application for the imported CFC-based MDIs aerosol products) since January 1, 2010.
31. (iv) Should any pharmaceutical manufacturer change excipients or dosage form of aerosols, it shall submit such applications in accordance with Provisions on Drug Registration.

CHAPTER 4 Technical Analysis

32. As CFCs propellants are degrading the ozone layer, researchers are studying on CFCs-free pharmaceutical aerosol. There are mainly two approaches to replace CFCs: i) to identify CFCs substitutes; ii) to use alternative delivery system, such as compressed-air spray, ultrasonic spray, two-phase system, self-pressurized system and dry powder inhaler. Presently, there are four commonly used CFCs substitutes: Hydrofluoroalkane (tetrafluoroethane HFA 134a and heptafluoropropane HFA 227), Dimethyl ether (DME), Hydrocarbon (isobutane) and compressed gas (e.g carbon dioxide). Substitute propellants being used in foreign countries comprise tetrafluoroethane HFA-134a, heptafluoropropane HFA-227 and DME.

1. Potential Substitutes

1) Hydrofluoroalkane

33. Compared with CFCs, Hydrofluoroalkane has similar properties, poorer chemical stability and less polarity. Table 4-1 indicates the physical and chemical properties of Hydrofluoroalkane and its impact on the atmosphere in comparison to CFCs.

Table 4-1 Properties of Hydrofluoroalkane and CFCs

Item	Trichlorofluoromethane (CFC-11)	Dichlorodifluoromethane (CFC-12)	Dichlorotetrafluoroethane (CFC-114)	Tetrafluoroethane (HFA-134a)	Heptafluoropropane (HFA-227)
Molecular Formula	CFCl_3	CF_2Cl_2	$\text{CF}_2\text{ClCF}_2\text{Cl}$	CF_3CFH_2	F_3CHFCF_3
Vapor Pressure (Psig/20°C)	-1.8	67.6	11.9	4.71	3.99
Boiling Point (°C)	-24	-30	4	-26.5	-17.3
Density (g/ml)	1.49	1.33	1.47	1.22	1.41
ODP*	1	1	0.7	0	0
GWP*	1	3	3.9	0.22	0.7
Atmospheric Life Cycle (year)	75	111	7200	15.5	33

*Ozone Depleting Potential/ Global Warming Potential relative to CFC-11

2). Dimethyl Ether (DME)

34. Table 4-2 shows the properties of DME (CH_3OCH_3). DME is flammable and has low acute and chronic toxicity. It is mainly used as CFCs substitute for external-use aerosols. One of DME's advantages is that it can be dissolved homogeneously with water at a certain proportion.

Table 4-2 Properties of DME

Molecular formula	CH_3OCH_3
Molecular weight	46.07
Boiling point	-24.9°C
Vapor pressure	6kg/cm ²
Density	0.66g/ml
Water solubility	35.5%
Flammability Limits in Air, Vol %	3.4~26.7%
Damage on ozone layer	-

3). Hydrocarbon

35. Table 4-3 lists the physical properties of Hydrocarbon (mainly including isobutane, propane, and n-butane). Despite with good stability and low density, Hydrocarbon is toxic, inflammable and explosive, thus entailing high safety standard for production. Hydrocarbon is commonly blended with Hydrofluoroalkane as propellant.

Table 4-3 Physical Properties of Hydrocarbon

Chemical Name	Formula	Molecular Weight	Flashing Point (°C)	Boiling Point (°C)	Vapor Pressure (gauge pressure, kPa, 21.1°C)	Liquid Density [21.1°C (g/cm ³)]	Flammability Limit in Air [% (ml/ml)]	
							Min.	Max.
Propane	CH ₃ (CH ₂)CH ₃	44.1	-104.4	-42.1	744.8	0.50	2.2	9.5
Isobutane	CH(CH ₃) ₃	58.1	-32.8	-11.7	214.3	0.56	1.8	8.4
N-butane	CH ₃ (CH ₂) ₂ CH ₃	58.1	-73.9	-0.5	116.4	0.58	1.9	3.5

4). Compressed Gas.

36. Table 4-4 lists the physical properties of compressed gas (mainly including carbon dioxide, nitrogen and nitrogen monoxide). In comparison with DME and HFA, Compressed Gas is more chemically stable and inflammable but has lower boiling point after liquefaction and higher vapor pressure at normal atmospheric temperature, thus requiring that packaging containers should withstand higher pressure (e.g. small steel cylinder as the packaging container). If un-liquefied compressed gas is filled in the container, pressure within the container falls rapidly and continuous injection cannot be maintained. Presently, compressed gas is basically not used for aerosol products, but for spray products.

Table 4-4 Physical Properties of Compressed Gas

Chemical name	Molecular Formula	Molecular Weight	Boiling Point (°C)	Vapor Pressure (gauge pressure, kPa, 21.1°C)	Inflammability
Carbon dioxide	CO ₂	44.0	-78.3 ¹	5767	No
Nitrogen monoxide	N ₂ O	44.0	-88.3	4961	No
Nitrogen	N ₂	28.0	-195.6	3287 ²	No

1: Sublimation; 2: Critical temperature: -147.2

37. During past few years, Boeheringer, Fisons, 3M, Glaxo and Riker have obtained relevant formulation patents which cover propellant system including components, co-solvent, hydrocarbon surfactant and fluoro-surfactant. It is reported that a few issues have to be solved for Hydrofluoroalkane being employed as propellants for pharmaceutical aerosol sector.

- i) **Co-solvent with Low Boiling Point.** Both tetrafluoroethane and heptafluoropropane have higher vapor pressure and are in gaseous state under normal atmospheric temperature. Presently, no Hydrofluoroalkane has the same high boiling point as CFC-11 does. Therefore, it brings challenges to design formulation and production process. One of solutions is to seek proper solvent without toxicity or irritation but with certain volatility and good compatibility with Hydrofluoroalkane. Commonly used co-solvents include low-molecular-weight alkane (e.g propane and butane) and low-molecular-weight alcohols (e.g ethanol and isopropanol).
- ii) **Surfactant Selection.** Surfactant is to disperse medicament particles and lubricate the valve. As Hydrofluoroalkane has smaller polarity than CFCs, it can not dissolve majority of surfactants. One solution is to identify surfactants with good solubility and compatibility with medicaments. Another solution is to add co-solvent which can dissolve surfactant.
- iii) **Drug Characteristics.** Some medicaments easily form solvate in new propellant system, thus increasing the tendency of crystal growth. Some poly-crystalline drugs (such as steroid hormone) are easier to have crystalline transformation and promote crystal growth. Thus, drug characteristics should be taken into account in formulation design, particularly in the design for the suspended aerosol.

- iv) **Valve Selection.** As Hydrofluoroalkane is less chemically stable than CFCs, valve components (e.g airproof rubber and its additive should be compatible with propellants. Similarly, valve components should not cause HFA to decompose. At present, several major valve companies such as Bepak, 3M and Valois conduct research on the valve system for Hydrofluoroalkane.
- v) **Alternative Actuator.** In case medicament can not be formulated into suspended aerosol, it is generally made into solution aerosol. In general, solution aerosol has poorer atomization effect. Decreasing vapor pressure of the canister results in bigger atomized particles sizes. Though increasing the pressure can reduce the particle sizes, it also causes majority of particulate medicaments to be accumulated at throat due to the bumping of particles arising from the increase of initial speed. Thus, it is needed to design new actuators which can both crash the particles and reduce the initial speed.

2. Preliminary Analysis

Table 4-5 Comparison of CFCs Substitutes

	Advantage	Disadvantage	Remarks
DME	Very soluble in water. In aqueous solutions, the propellant is hydrolytically stable over a wide pH range. Zero ODP.	Acute and chronic toxicity. May cause anesthetic effects. May irritate eyes, skin, and mucous membranes. Flammable.	DME is a flammable chemical. If using it as the CFCs substitute, Chinese pharmaceutical manufacturers have to renovate their workshops substantially or may have to relocate to other places. The incremental cost is likely to be astronomical.
Hydrocarbon	Low cost of Hydrocarbon; Zero ODP; Negligible greenhouse effect; Excellent solvent. Low GWP.	Highly flammable; Aftertaste; Unknown toxicity following inhalation; Low level density. Potential reaction and interaction with TCM. High conversion cost.	Hydrocarbon is a flammable chemical. If using it as the CFCs substitute, Chinese pharmaceutical manufacturers have to renovate their workshops substantially or may have to relocate to other places. The incremental cost is likely to be astronomical.
HFA	Low inhalation toxicity; High chemical stability; High purity; Zero ODP;	Poor solvents; GWP lower than CFC's; High cost of HFA. Low conversion cost.	HFA is known to be used by foreign manufacturers as CFCs substitutes.
Compressed Gas	Low inhalation toxicity; High chemical stability ; High purity; Inexpensive; Zero ODP.	Require use of a non-volatile co-solvent; Produce coarse droplet spray; Pressure falls during use;	Use of compressed gas propellant is typically restricted to applications where spray characteristics are not critical;

3. Conclusion

38. Based on the above technical analysis, it is tentatively concluded that

- Ideal CFCs substitutes should possess properties such as similar physical properties, insignificant damage to the atmosphere, similar toxicity, good thermodynamic property, non-inflammability and economical feasibility.
- In comparison with DME and Hydrocarbon, the properties of HFA are similar to those of CFCs.

Besides, international experience shows that HFA is the substitute being widely used in foreign countries. HFA-134a is chemically stable, requiring less modification on existing equipment and associated facilities.

- c. The properties of DME and Hydrocarbon are not similar to those of CFCs. Exploring the conversion to DME or Hydrocarbon is more technically difficult, though the two chemicals are cheaper than HFA. Especially for Traditional Chinese Medicine Applications, there is no international experience for Chinese manufacturers.
- d. Compressed gas is often used for spray products but not for aerosol products.
- e. It is assumed that the majority of Chinese pharmaceutical aerosol manufacturers, after screening a variety of substitutes, are likely to use the HFA as CFCs substitute.

CHAPTER 5 Phaseout Strategy

1. Principle.

39. The phaseout of CFCs in China pharmaceutical aerosol sector should not impose any significant negative impact on the clinic demand for aerosol products. In other words, the principle of the strategy is to phase out CFCs rather than the pharmaceutical aerosol products.

2. Two priority Issues.

40. **a. Substitute Selection.** Out of 44 aerosol applications, Chinese manufacturers have 26 Traditional Chinese Medicinal Aerosols, for which no experience can be borrowed from the abroad. Thus selection of suitable substitutes for those TCM aerosols will be challenging. Based on international experience, HFA-134a, HFA-227, DME, hydrocarbon (isobutane) and compressed gas (carbon dioxide) are deemed as potential CFCs substitutes. However, each CFCs substitute has different chemical and physical properties. Each aerosol application is different in terms of production process and formulation. Therefore, selection of suitable CFCs substitute or conversion technology (such as alternative delivery system) is the key issue for CFCs phase-out in China pharmaceutical aerosol sector. The pharmaceutical aerosol manufacturers will have to screen CFCs substitutes or conversion technology first, then determine conversion plan which covers new formulations and production process.
41. **b. Preparation for Technical Dossier for Registration.** In accordance with relevant laws and regulations, replacement of CFCs with alternative excipients is subject to the approval of the government agencies. Manufacturers have to prepare technical dossier stipulated by the regulations so as to have their CFCs-free products registered at SFDA. The preparation for registration should be immediately initiated after the completion of the substitute selection

3. New Policies Proposed.

42. **a. Policies over Transition Period (July 1, 2007~December 31, 2009).** China will stop using CFCs as excipients for external-use aerosols since July 1, 2007. Given the limited timeframe, pharmaceutical aerosol manufacturers have to use CFCs in storage before they can obtain from SFDA the approval numbers for their new products. However, using of CFC in storage would be under stringent supervision of the government. SFDA will make transitional arrangement within the framework of Country Program. When receiving the application form the manufacturers for using CFCs in storage during the transition period, SFDA and SEPA will review and approve the applications. SEPA plans to establish a license system to control CFCs consumption for those aerosol manufacturers.
43. **b. Supervision after 2010.** After 2010, SFDA will monitor non-CFCs aerosol products so as to guarantee its safety and efficacy of clinical application.

4. Phaseout Schedule.

44. China plans to implement the CFCs phaseout for pharmaceutical aerosol sector in three stages.
- The first stage is to develop sector policies and to screen substitutes (January-December, 2007);
 - the second stage is to complete registration for new aerosol products (January 2007-June 2009);
 - In parallel, the third stage is to start new production after the completion of facility modification, production validation and staff training (July, 2007-December 2009).

CHAPTER 6 Cost Analysis

1. Basis for Cost Calculation

45. **Cutting-off Date.** The cutting-off date of July 25, 1995 should not be applied to the pharmaceutical sector as substitute aerosol technology in 1990s was not available. It is proposed that the cutting off date should be July 1, 1999 after which Article 5 Parties had the obligation to freeze CFCs production and consumption. China will not request MLF fund for seven manufacturers with production lines established after the cutting-off date. Those enterprises have to use their own funding to phase out CFCs consumption.
46. **Eligible Incremental Cost.** Cost calculation covers Technical Assistance (TA), preparation for technical dossier for registration of new aerosol products, modification on the existing facilities, production validation, staff training and two years (and not four years as used as default until the ExCom establishes guidelines for new sectors and sub-sectors)) of Incremental Operation Cost. For eligible manufacturers with baseline consumption, both Incremental Capital(IC) and Incremental Operation Cost (IOC) are considered as eligible Incremental Cost. A few eligible manufacturers have not been in production for years. However, as long as they have aerosol product approval numbers issued by SFDA, they have legal rights to resume production depending on the market demand. Therefore, for those manufacturers without the baseline consumption, only cost for substitute screening and cost for preparation for technical dossier for registration purpose are considered as eligible incremental cost.
47. **Reasons to Use HFC-134a for Cost Calculation.** Cost analysis is based on the sector survey and the literature review on international experience. It is estimated that from technical perspective, majority of Chinese pharmaceutical aerosol manufacturers may use HFA (e.g. HFA-134a, HFA-227) as CFCs substitute after screening a variety of substitutes. Besides, conversion to HFA is more financially feasible in China because in case of conversion to DME or Hydrocarbon, Chinese manufacturers have to renovate their workshops substantially or relocate to other places to meet safety standards. As CFCs has high chemical stability, it is not mandatory that the existing workshops meet national anti-explosive standards or safety standards. If converted to hydrocarbon and DME production, the existing facilities and the workshops would have to be replaced to meet the area hazard classification as per Chinese regulations. Storage vessels, pipe system and valves would have to be installed according to Chinese safety regulations, which might not in all cases be possible without relocation of workshops. As the filling takes place in special enclosed clean rooms, use of hydrocarbon as propellant would require changes to the ventilation system and enclosure as well. Consequently, the conversion cost to Hydrocarbon or DME would be very prohibitive.
48. In Chinese market, HFA-227 is slightly more expensive than HFA-134a. Besides, only limited experience on the conversion to HFA-134a is available when the sector plan is under preparation. Therefore, the Incremental Cost calculation is based on the conversion to HFA-134a. In case any Chinese pharmaceutical aerosol manufacturer selects other substitutes (e.g. DME, Hydrocarbon or others) in the future, it is the manufacturer which has to raise sufficient counterpart funding for the renovation or the relocation of its workshops.

2. Technical Assistance (TA)

49. In order to implement the sector plan smoothly, it is necessary to undertake TA activities. Total Fund requested for Technical Assistance is 1.1 million US dollars covering the following activities:
- Workshops for aerosol manufacturers, equipment manufacturers and technical experts during the implementation of the sector plan.
 - Training for government agencies such as local Food and Drug Administration Bureaus and

Environmental Protection Bureaus on the implementation of the phaseout policies;

- c. Public awareness promotion including training activities;
- d. Recruitment of individual consultants to provide technical support for phaseout activities. Recruitment of consultant firms to provide technical support such as review test data and appraise feasibility study reports etc.;
- e. Development of a MIS system.
- f. Auditing for CFCs consumption annually for pharmaceutical aerosol manufacturers
- g. Study tours to learn international experience.
- h. Other TAs as necessary.

3. Incremental Cost for Manufacturers.

3.1. Substitute Screening

50. Presently, due to lack of testing data, Chinese pharmaceutical manufacturers are not able to decide which substitute is the best one for their aerosol products, particularly for those producing Traditional Chinese Medicine aerosol products. MLF Funding is requested to allow those enterprises to screen potential substitutes as mentioned in Chapter 4. The objective of the screening is to identify the best substitute or alternative delivery system for their pharmaceutical aerosol products. Due to business confidentiality and potential property rights which may arise from the conversion, manufacturers should screen substitutes by themselves. In case some manufacturers do not have such capacity, they may have to engage qualified institutions to do the screening. After the screening, manufacturers should submit feasibility study reports for the conversion to non-CFCs production, which consists of screening on formulations and production processes, preliminary evaluation on drug quality and stability, pharmacology comparison test, preliminary evaluation on toxicology and preliminary analysis on the manufacturing equipment. Those study reports will furnish technical basis to develop phase-out policies and to make arrangement for the transitional period. These reports may also provide technical reference for those non-eligible manufacturers so as to facilitate CFCs phase-out in the whole sector.
51. If suitable CFCs alternatives can not be identified for an application, it would be necessary to use alternative delivery system, such as compressed air spray, ultrasonic spray, two-phase system, self-pressurized system and dry powder inhaler. Such alternative delivery system would have to follow the same screening procedures as that for aerosol products.
52. In case some manufacturers are not able at all to identify suitable substitute or alternative delivery system, their study reports may also be used as technical basis for exemption applications for essential use after January 1, 2010.
53. The cost for each item of the tests is shown in table 6-1. There are 63 aerosol products owned by 32 manufacturers, so the total cost adds up to USD 2,756,250.

Table 6-1 Cost for Screening Substitutes

Item	Activity	Cost (USD)
Screening for Formulations and Production Process	Test for Formulation and Production Process	12,500
Evaluation on Quality and Stability	Evaluation on Quality-related Factors	6,250
	Preliminary Stability Test	6,250
Pharmacodynamics Comparative Test		6,250
Preliminary Toxicology Evaluation		6,250
Pre-analysis on Major Equipment		6,250

Subtotal	43,750
Number of Products	63
Total Cost (US\$)	2,756,250

3.2. Preparation of Technical Dossier for CFCs-Free Aerosol Registration Application

54. As any change in excipients or delivery system may have consequence for the safety and efficacy, *China Drug Administration Law* and *Provisions of Drug Registration* require that pharmaceutical aerosol manufacturers apply for new registration. For the registration purpose, manufacturers have to prepare technical dossier in accordance with relevant national regulations, Table 6-2 lists the dossier for application for change of excipients already with National Standards; Table 6-3 lists the dossier for Drug Registration Application with New Excipients; Table 6-4 lists the dossier for Drug Registration Application for Change in Dosage Form.

Table 6-2 Dossier for Application for Change of Excipients with National Standards

No.	Document Name
1	photocopy of drug approval certificate and appendix
2	supporting documents
3	Sample of revised <i>Package Insert</i> enclosed with detailed revision illustrations
4	Sample of revised package/ label enclosed with detailed revision illustrations
5	Documents of pharmacological research
6	Sample of drug
23	Research documents & literature of genital toxicity research
24	Research documents & literature of carcinogenesis research
25	Domestic and foreign relevant overview of clinical trial documents
26	Plan & scheme of clinical trial
27	Clinical researcher manual
28	Sample of Informed Consent, and approval document of Ethics Committee.
29	Clinical Trial Report

Table 6-3 Dossier for Drug Registration Application with New Excipients

No	Document Name
1	Name & naming basis of medicinal adjuvant
2	Certification documents
3	Objective & basis of topic establishment
4	Summary & assessment of main research results
5	Sample of <i>Package Insert</i> , drafting illustrations, and latest reference
6	Design sample of package & label
7	Overview of pharmacological research documents
8	Research documents & literature of production process
9	Research documents & literature verifying chemical structure or compositions
10	Research documents & literature of quality research work
11	Research documents & literature of drug-related compatibility
12	Standard draft and drafting illustrations, with standard product or control product
13	Inspection Report on 3 continuous batches of samples
14	Research documents & literature of stability research
15	Selection basis & quality standard of packing materials and containers in direct contact with medicinal adjuvant
16	Overview of pharmacological & toxicological research documents
17	Research documents & literature of pharmacodynamics influence on to-be-applied drug

No	Document Name
18	Research documents & literature of general pharmacological research
19	Research documents & literature of acute toxicological research
20	Research documents & literature of long-term toxicological research
21	Research documents & literature of main local/systemic-administration-related special safety test, such as allergy (local, systemic, and light), hemolysis, and local irritability (blood vessel, mucosa, muscle)
22	Research documents & literature of mutagenesis research
23	Research documents & literature of genital toxicity research
24	Research documents & literature of carcinogenesis research
25	Domestic and foreign relevant overview of clinical trial documents
26	Plan & scheme of clinical trial
27	Clinical researcher manual
28	Sample of Informed Consent, and approval document of Ethics Committee.
29	Clinical Trial Report

Table 6-4 Dossier for Drug Registration Application for Change in Dosage Form.

No.	Document Name
1	Drug name
2	Certification documents
3	Objective & basis of topic establishment
4	Summary & assessment of main research results
5	<i>Package Insert</i> , drafting illustrations, and relevant reference
6	Design sample of package & label
7	Overview of pharmacological research documents
8	Research documents & literature of production process for raw drugs, and research documents & literature of prescription and process for preparation
9	Research documents & literature verifying chemical structure or compositions
10	Research documents & literature of quality research work
11	Drug standard and drafting illustrations, with standard product or control product
12	Inspection Report on samples
13	Origin, quality standard, and Inspection report of raw drugs and adjuvant
14	Research documents & literature of drug stability research
15	Selection basis & quality standard of packing materials and containers in direct contact with drug
16	Overview of pharmacological & toxicological research documents
17	Research documents & literature of special safety test, such as allergy (local, systemic, and light), hemolysis, and local irritability (blood vessel, mucosa, muscle)
18	Research documents & literature other than clinical pharmacokinetics research
19	Domestic and foreign relevant overview of clinical trial documents
20	Plan & scheme of clinical trial
21	Clinical researcher manual
22	Sample of Informed Consent, and approval document of Ethics Committee.
23	Clinical Trial Report

55. Cost for preparation for the technical dossier will depend on applications, selected propellants and production process. It can not be accurately calculated at the current stage. Therefore, Table 6-5 is the best estimation based on the past experience. Six key items are included for the estimation, though there are other items not included. Compared with the Skin Aerosol, cost for dossier preparation for Cavity Aerosol is more costly because the requirement for the latter is more stringent.

56. In accordance with relevant regulations, each manufacturer has to make registration for their aerosol

products based on its formulation and production process, though some products may also be produced by multiple manufacturers. Therefore, enterprises have to make registration application for total 42 Skin Aerosol products and 21 Cavity Aerosol products.

Table 6-5 Cost for Preparation for Technical Dossier for Registration

No.	Name of the data	Cost for Skin Aerosol Product (USD\$)	Cost for Cavity Aerosol Product (USD\$)
1	Study on Pharmacy	6,250	6,250
2	Study on Production Process	12,500	12,500
3	Study on Quality	6,250	6,250
4	Pharmacological Study	18,750	25,000
5	Toxicological Study	18,750	25,000
6	Special Safety Test	125,00	18,750
	Subtotal	75,000	93,750
	Number of Products	42	21
	Subtotal	3,150,000	1,968,750
	Total	5,118,750	

3.3. Modification on Existing Facilities

57. The requested incremental cost for modification on existing facilities is based on the assumption that these manufacturers will convert to a non-flammable propellant such as HFA-134a. As HFC-134a is not compatible with hermetic materials of the existing facilities, it is needed to modify or replace existing pumps, pipes, hermetic components for pipes, valves and filling&charging equipment and associated instruments.
58. Based on the sector survey, existing production lines can be divided into two groups, one is automatic (Type A), while the other is semi-automatic (Type B). Modification cost is showed in Table 6-6.

Table 6-6 Modification Cost for Existing Facilities

Items	Type A (USD)	Type B (USD)
1.1 Storage Vessel for Propellant	15,000	15,000
1.2 Pipes and Hermetic Components(for pipes, valves, filling& charging equipment)	10,000	10,000
1.3 Pumps	12,500	12,500
1.4 Detecting Leakage Equipment	25,000	N.A
1. 5 Labor Cost	1,250	1,250
Total Cost for One Line with Baseline Consumption	63,750	38,750
Number of Lines with Baseline Consumption	14	8
Subtotal	892,500	310,000
Total	1,202,500	

59. In the case of conversion to Hydrocarbon, estimated modification cost based on initial assessment for enterprises would be as follows:

Table 6-7 Modification Cost for One Production Line Converted to Hydrocarbon*

Item	Cost (USD)
1.1. Replacement of Existing Filing Line	150,000
1.2 Piping and Valves	40,000
1.3. Hydrocarbon Storage Tank	30,000

Item	Cost (USD)
1.4. Replacement of Electrical Installation and Grounding of Filling Line:	20,000
1.5. Aerosol Lid Control	5,000
1.6. Clean Room Modification and Ventilation System:	20,000
1.7. Gas Detection System:	15,000
1.8. Fireproof Facility	30,000
1.9. Installation	20,000
1.10: Safety Certification:	30,000
Subtotal	360,000
Number of Lines with Baseline Consumption	22
Total	7,920,000

* Cost for workshop relocation is not taken into accounted.

3.4. Production Validation

60. *Provisions on Quality Management for Pharmaceutical Production* (SFDA #9, effective August 1, 1998) was issued by SFDA in 1998. Article 57 stipulates that validation for pharmaceutical production shall consist of validation for workshop, validation for installation of facilities and equipment, validation for facility operation and performance and validation for products. Article 58 states that re-validation shall be carried out in case of change of main quality related factors such as production process, quality control method, main excipients and production facility,
61. In accordance with *Guidance of Validation for Pharmaceutical Production* (2004), Drug production validation includes prospective validation, concurrent validation, retrospective validation and revalidation. Due to the replacement of propellant or change of dosage form, new production equipment, new production technology and new product application may be introduced. Therefore, it is necessary to carry out prospective validation before commercial production. The purpose of prospective validation is to evaluate and confirm the reproducibility and reliability of production process. Concurrent validation is to obtain data from the actual process operation, so as to prove that it fulfills the expected requirements. Retrospective validation is to collect statistics data and make trend analysis after normal production for a certain period of time, thus discovering the worst conditions for the process operation and indicating the risk of potential malfunction. Revalidation includes compulsive validation, alterant validation and regular validation.

A. Validation for Changing Excipient (Alternative Propellant)

62. Changing of excipients has to conduct prospective validation, concurrent validation, retrospective validation and revalidation. The validation include i) validation of workshop; ii) validation of public utilities; iii) validation of computer system; iv) validation of production equipment; v) validation of production process; vi) validation of personnel; vii) validation of other relevant items

a) Validation for Workshop, Public Utility System and Computer System

63. Validation of workshop is to confirm that 1) reconstructed workshops shall be in compliance with design standards; 2) the flow of people and materials shall be reasonable; 3) workshop cleanliness shall be up to the level of 300,000. Validation of public utilities consists of six items, namely, heating, ventilation, air conditioning, discharging system, cooling system and propellant supply system. Validation of computer system consist of four items, namely, batch record/SOP management system, material management system, lab system and the management system for production/engineering spare parts.

b) Validation for Production Equipment

64. Validation of production equipment comprises six items, namely, weighing scales, containers, valve cleansing equipment, and compound vessel system, filling equipment, weight inspection system and

spray inspection system.

c) Validation for Production Process

- (i) Validation items for dispensing preparation includes: temperature of liquid product in compound vessels, particle sizes and homogenization of the drug liquid.
- (ii) Validation of cleaning effect of containers: various impurities placed into the container shall be totally removed after cleaning.
- (iii) Validation items for filling process include appearance, filling weight and leakage. At least three batches shall be inspected. Samples shall be taken from different places to check the appearance, filling weight, active ingredient and leakage.
- (iv) Validation items for weighting equipment include weighing accuracy and elimination of under-weighed and over-weighed samples.
- (v) Validation items for the product inspection time include leakage and shot weight per actuation. Different inspection times shall be selected to test the leakage and the shot per actuation so as to find out the best inspection time.
- (vi) Validation item for spray inspection include the performance of spray and elimination of samples that don't spray or don't spray constantly.
- (vii) Against product quality standard, validation items for metered aerosols comprise appearance, active ingredient per actuation, times of actuation per canister, shot weight per actuation, spray distribution, microbes, etc. Validation for non-metered aerosol includes appearance, spray speed, shot weight per actuation and microbes, etc. At least three batches of samples shall be inspected with validated sampling and analysis methods to ensure that finished products are produced steadily in compliance with product delivery standards.
- (viii) Validation items for cleanliness include the cleanliness of compound vessels and filling lines. There shall be no cross-contamination between different batches. After filling of cleaning, the contents of raw medicinal material, water and solvent shall be measured, to make sure that no active medicinal material or solvent remains.

d) Validation for Personnel and Other Relevant Items

65. Validation for personnel consists of establishment of filing system for each person engaged in aerosol production, including records for training, health and safety and personnel performance, etc. Validation for other relevant items includes document record, instrument calibration, preventative maintenance, production areas, and area for changing clothes, and waste cleansing and sterilization.

B. Validation for Change in Dosage Form

66. For change in dosage form, it is required to conduct prospective validation, concurrent validation, retrospective validation and revalidation. The validations are basically the same as those for Part A, except that there are some differences in validation items for finished product, which are part of production process validation. Validation for metered aerosol includes appearance, total times of actuation per canister shot weight per actuation, active ingredient per actuation, spray distribution, variation of filling amount (filling amount) and microbes, etc. Validation items for non-metered aerosol includes appearance, spray speed, shot weight per actuation and microbes, etc. At least three batches of samples shall be inspected with validated sampling and analysis methods to ensure that finished products are produced steadily in compliance with product delivery standards.
67. There are 22 production lines which had aerosol production during the baseline year. Cost for production validation is detailed in Table 6-8.

Table 6-8 Cost for Production Validation

No.	Validation	Contents	Cost (US\$)
1	Equipment	Scales, Containers, Valve Cleansing Equipment; Compound Vessel System; Filling & Charging Equipment; Weight Checking System; Spray Checking System	12,500
2	Production Process	Liquid Drug Processing, Cleaning effectiveness for Containers; Filling Process; Weight Checking System; Product Checking Time; Spray Checking; Finished Products; Cleaning Effectiveness.	18,750
3	Others	Workshop; Public Utilities; Computer System; Others	6,250
Subtotal for One Production Line			37,500
Number of Production Lines with Baseline Consumption			22
Total			825,000

3.5. Staff Training

68. Due to the introduction of new substitute, it is necessary to provide training for the staff of the manufacturers. Those people who should receive training include Quality Control technicians, operators, recorders, engineers, management staff and those working for procurement, transportation and maintenance. It is estimated that each manufacturer has 20 for production and 40 for sales.

Table 6-9 Staff Training Cost

	Production Staff	Sales Staff
Number of Trainees	20	40
Unit Cost (US\$/person)	125	375
Subtotal (US\$)	2500	15,000
Subtotal for One Production Lines(US\$)	17,500	
Number of Production Lines with Baseline Consumption	22	
Total	385,000	

3.6. Incremental Operating Cost

69. The calculation is based on the data collected from manufacturers during the survey undertaken by NICBPB, SFDA and SEPA. Baseline production data is shown in Table 2-3. Calculation of IOC is based on the ExCom guidelines and using Incremental Operating Cost for a period of two years.

70. For the new production, the propellant, valve and canister etc. have to be changed. Table 6-10 shows the prices of CFCs and HFA-134a in 2005, which is consistent with the baseline year.

Table 6-10 Price of Propellant

	Baseline Consumption (MT)	Price (USD/MT)
CFC-11	112.723	1,643
CFC-12	365.964	2,366
CFCs Weighted Price		2,196
HFC-134a Price		7,380

71. The total production quantity of baseline year is 10,121,216 pieces of aerosol products, of which 9,590,363 are of skin aerosols. The average CFCs consumption for skin aerosol products is 47.50 gram/canister, while that for cavity aerosol is 16.57gram/canister. Literature reviews indicates that on average, HFA aerosols uses 30% less propellant than CFCs aerosols. Therefore, it is assumed that after conversion, the average HFA-134a consumption for skin aerosol products is 33.25 gram/canister, while that for cavity aerosol is 11.60 gram/canister. Calculation for Incremental Operation Cost is shown in Table 6-11.

72. Due to the price difference of HFA-134a and CFCs, it is proposed that those manufacturers be financed with two years of Incremental Operation Cost only (USD 3,536,824) (and not four year as per the general rules until the Excom decides). The IOC will be allocated to eligible pharmaceutical aerosol manufacturers based on their baseline year production.

3.7. Contingency

73. Contingency is calculated as 10% of the TA and total Incremental Capital(IC).

3.8. Deduction Due to Foreign Share

74. Out of 32 eligible manufacturers, there are three joint ventures (#13, #14, and #22) with foreign shares (i.e. British Virgin Islands and USA). Funding for these enterprises is prorated according to Chinese share. Total USD 489,918 will be deducted (see Annex I).

Table 6-11 Incremental Operation Cost

I. IOC for Skin Aerosol							
Items	Before Conversion(CFCs as propellant)		After Conversion(HFA-134 a as propellant)		IOC for One Piece of Aerosol	Skin Aerosol Production Quantity	IOC for Skin Aerosol
		Unit Cost (US\$/can)		Unit Cost (US\$/can)			
1. Propellant		0.10433		0.24523	0.14090		
Price(USD/g)	0.00220		0.00738				
Average Propellant Consumption(g/can)	47.50		33.25				
2. Canister		0.16875		0.19125	0.02250		
3 Valve		0.04813		0.05188	0.00375		
Subtotal		0.32120		0.48835	0.16715	9,590,363	1,603,058
II. IOC for Cavity Aerosol							
Items	Before Conversion(CFCs as propellant)		After Conversion(HFA-134 a as propellant)		IOC for One Piece of Aerosol	Cavity Aerosol Production Quantity	IOC for Cavity Aerosol
		Unit Cost (US\$/can)		Unit Cost (US\$/can)			
1. Propellant		0.03638		0.08552	0.04914		
Price(USD/g)	0.00220		0.00738				
Average Propellant Consumption(g/can)	16.57		11.60				
2. Canister		0.16875		0.19125	0.02250		
3 Valve		0.12250		0.47500	0.35250		
Subtotal		0.32763		0.75177	0.42414	530,853	225,156
III. Total IOC for one year							1,828,214
IOC(discount @7%)		Cumulative					
IOC for one year	1,828,214	1,828,214					
IOC for 2 nd year	1,708,611	3,536,824					
ICO for 3 rd year	1,596,833	5,133,657					
IOC for 4 th year	1,492,367	6,626,024					

Summary: Incremental Cost

No.	Components	Cost (USD)
A	Technical Assistance	1,100,000
B	Incremental Capital Cost (Manufacturer Conversion Cost)	10,287,500
B.1	Screening Substitutes	2,756,250
B.2	Cost for Preparation for Technical Dossier for Registration Application	5,118,750
B.3	Modification on Existing Facilities	1,202,500
B.4	Validation	825,000
B.5	Staff Training	385,000
C	IOC of Two Years (discount rate@7%)	3,536,824
D	Contingency (10% of A+B+C)	1,492,432
	Subtotal (A+B+C+D)	16,416,757
E	Deduction Due to Foreign Share	- 489,918
	Total(A+B+C+D+E)	15,926,839
	Total Requested Funding	15,926,839

Chapter 7 Operation Mechanism

75. This Chapter explains the procedures for establishing funding arrangements and operating mechanisms for project management, coordination, supervision and evaluation as well as the responsibilities of various institutions involved in implementation of this Sector Plan.

1. Umbrella Grant Agreement

76. China and the World Bank have signed an Umbrella Grant Agreement in December 1997. The Agreement sets forth the terms and conditions under which grant resources approved by the ExCom in sector approaches in China would be carried out. This Agreement includes provisions that allow the Bank to disburse funds to China based on performance indicators, and will also be extended to the pharmaceutical aerosol sector.

2. Funding Arrangements

77. MLF Approval: it is anticipated that funds for this Sector Plan would be approved in two steps:

- a The Government, through the World Bank, will request that the ExCom consider this overall sector plan and agree to fund the phase-out with tranches, provided that China meets agreed annual phase-out targets for the previous year. At the same time, the Government will also apply for approval of the First Biennial Program, presently proposed to cover activities in the calendar years from 2007 to 2008, which will be submitted to the ExCom as a separate document.
- b From 2007 onwards, another Biennial Programs will be submitted to the last ExCom meeting of 2008, setting out the annual targets and funding requests. The amount of annual funding request would be consistent with the funding amounts indicated in the overall sector plan. The ExCom would be asked to release funds at the levels agreed to in the sector plan based on achievement of previous phase-out targets, so that the next Biennial Program could start in the following January. In general, approval of funds would be based on achievement of agreed ODS phase-out targets.

78. In case China fails to reach the phase-out targets for a given year, i.e., if CFCs consumption for pharmaceutical Aerosol Sector exceeds the agreed targets or the phase-out amount contracted is less than that required to meet the target, the Bank and China would agree on remedial actions before applying for the next funding. The remedial actions proposed would be to bring the program back on track in the coming year, and would be further subject to ExCom approval. Other conditions as stated in the Umbrella Grant Agreement would also apply.

79. The Biennial Program would contain the following sections:

- a Sector phase-out schedule, including phase-out activities, manufacturers involved, phase-out approaches adopted and the phase-out timetable arranged;
- b Status of all activities of previous year(s) and any agreed remedial actions if necessary, for the current year;
- c Objectives of Biennial Program – phase-out targets and funding requirements for activities in the following year;
- d Description of activities in the Biennial Program, including phase-out activities for the manufacturers involved, any new policies to be taken up, and technical assistance activities;
- e Performance indicators of the Biennial program.

80. The World Bank would approve the technical assistance consistent with the Biennial Program, based on agreed Terms of reference for each TA (including the funding level of TA) in that year's Biennial Program.

3. Disbursement Mechanism

81. MLF disbursement to the World Bank: Upon approval of the Biennial Program by the ExCom, the Multilateral Fund will transfer the funding to the World Bank account.

82. World Bank disbursement to China: There would be four disbursements into the ODS Phase-out Account at SEPA for each Biennial Program. The Government would be allowed to request these four disbursements at any time during the year, provided that the disbursement conditions have been met. In any particular year, disbursement to China will start only when the Bank receives grants for that Biennial Program from the MLF. Disbursement conditions and amounts to be disbursed are as follows:

a **First disbursement** – funds for technical assistance and DIA’s agency fees. **Condition:** Approval of the Biennial Program by the ExCom and release of funding to the World Bank.

b **Second disbursement** – 50% of funds allocated for manufacturer activities and 50% of China’s management fees.

Conditions:

I) 30% of all contracts covering target phase-out amount of the current year’s Biennial Program have been signed by government with manufacturers;

II) Progress report on this sector plan implementation is satisfactory to the Bank; and

III) Any other conditions as specified in the current Biennial Program.

c **Third disbursement** – 30% of funds allocated to manufacturer activities and 30% of China’s management fees.

Conditions:

I) 100% of all contracts covering target phase-out amount and TA contracts of the current year’s Biennial Program have been signed;

II) The government reports the actual consumption does not exceed the consumption target set for the previous year (not applicable to the first implementation program);

III) A Progress report should be provided to the Bank, which is satisfactory to the Bank;

IV) the Biennial Program implementation should be considered satisfactory to the Bank; and

V) Any other conditions as specified in the current Biennial Program.

d **Fourth disbursement** – 20% of funds allocated to manufacturer activities and 20% of China’s management fees.

Conditions:

I) Performance audit of the previous year’s Biennial Program is acceptable to the Bank;

II) Progress report on sector plan implementation is satisfactory to the Bank; and

III) Any other conditions as specified in the current Biennial Program.

83. In the event that any phase-out target is not met, the Bank will suspend further disbursements to China. Disbursements will resume only after China and the Bank agree on and carry out remedial actions.

84. The grant funds will be allocated to manufacturers in consistence with the MLF funding approved for the sector. Manufacturers would sign ODS reduction contracts with SEPA.

85. The contracts will stipulate, among others, (a) Date and amount of ODS phase-out in applications; (b)

the disposal equipment list, if any; (c) and agreed disposal dates.

4. Management and Coordination

86. The Government would be responsible for implementing this Sector Plan. PMO will manage and coordinate execution of each Biennial Program. In addition, SFDA and SEPA will select a qualified firm as a Domestic Implementing Agency (DIA) to help manage day-to-day activities at manufacturer level. The World Bank will supervise overall implementation of this Sector Plan, replenish the ODS IV project account, report implementation progress to the ExCom and submit future funding requests to the ExCom.

A) State Food and Drug Administration

87. State Food and Drug Administration (SFDA) will play an important role in the preparation and execution of the yearly program. Responsibilities of SFDA include the following

- (i) To establish CFCs phase-out policies for pharmaceutical aerosol sector;
- (ii) To organize local FDAs to implement phase-out policies and undertake irregular spot check to the pharmaceutical aerosol manufacturers
- (iii) To supervise CFCs consumption of pharmaceutical aerosol manufacturers;
- (iv) To ensure adequate clinical supply of pharmaceutical aerosol products.

B) Foreign Economic Cooperation Office (FECO)

88. FECO is a management department to implement the environmental protection projects financed by the organizations of the United Nations and international or regional financial organizations. It hosts the project management office (PMO) for ODS projects. Responsibilities of FECO include the following:

- a To supervise PMO activities,
- b The financial division of FECO manages the ODS IV phase-out special account,
 - I) prepare and submit withdrawal applications to WB for advance deposit;
 - II) review the application of disbursement from beneficiaries according to the manufacturer contracts and TA contracts and make disbursement,
 - III) keep financial records and account details,
 - IV) Provide financial information on the ODS IV account to the audit agency and assist the work of the audit agency.
- c On behalf of SEPA, sign the ODS phase-out contracts, including manufacturer contracts and TA project contracts;
- d On behalf of SEPA, handover the ownership of all the equipment purchased under the ODS project to the manufacturers after the project commissioning.

C) Project Management Office (PMO)

89. PMO is the National Ozone Unit (NOU) of China with full responsibility to implement the international and national policies and regulations, and manage the information concerning the ozone layer protection. It is also in charge of the project selection, development and submission to the Multilateral Fund. Once the ExCom approves project, the PMO will coordinate, manage and monitor its implementation. PMO consists of the staff from Pollution Control Department, International

Cooperation Department of SEPA and FECO. It is responsible for the routine management of all the activities of ODS phase-out consistent with the MP and reports to the Leading Group on key issues. PMO is set up in the FECO of SEPA. Its responsibilities are as follows:

- a. To coordinate with related line ministries, industrial departments and related industrial association to jointly prepare the sector plans for completely phasing out ODS in a given sector, including the implementation mechanism and the policies in favor of ODS phase-out to ensure healthy development of industries;
- b. To select the domestic implementing agents (DIA) and endorse procurement agents selected;
- c. To organize and implement sector plans strictly in accordance with the agreement signed between the Chinese Government and the ExCom;
 - I) review of the Biennial Programs prepared by the special working groups (SWG) and submit the Biennial Programs to the ExCom through the World Bank for approval,
 - II) review of the work plans prepared by the SWGs,
 - III) approval of project documents prepared and submitted by SWGs,
 - IV) review of progress reports submitted by SWGs,
 - V) helping SWGs to solve problems encountered during project implementation,
 - VI) Coordinating SWGs on ODS data reporting, policy formulation, training, and information exchange.
- d. To supervise SWGs' activities and provide with necessary working conditions,
- e. To communicate and reach an agreement with the World Bank on the important issues during the implementation of projects,
- f. To cooperate with audit agency to carry out audit,
- g. To assist the World Bank and the ExCom in necessary project evaluation.
- h. To be responsible for implementation of Technical Assistant Projects (TAs)
 - I) To define the demand on TA projects;
 - II) To review all of the TORs of TA projects written by the SWG;
 - III) To review the selection of consultants for TA projects;
 - IV) To authorize disbursement to all the technical assistant project;
 - V) To evaluate the results of technical assistant projects and determine if further improvement is necessary.

D) Local Environmental Protection Bureau(EPB) and Local Food and Drug Administration(FDAs)

90. Local EPB and FDAs are bureaus with jurisdiction over the geographical areas where the project manufacturers are located. The responsibilities of local FDAs and EPBs are the following:

- a. To implement the ODS phase-out policies in the region;
- b. To assist to resolve the issues in the region during the implementing of the project with the request of the SFDA and SEPA;
- c. To assist to verify the ODS consumption of the manufacturers, attend the project commissioning with the request of the SEPA and SFDA;
- d. To supervise the disposal of the ODS equipment, if any;

- e. To supervise the manufacturers to comply with ODS quota system;
- f. To attend the training with the request of SFDA and SEPA.

E) Domestic Implementation Agent (DIA)

91. A DIA will be competitively selected by PMO for the Sector Plan (SP) after it is approved. The DIA will assist PMO in managing the implementation of SPs and Biennial Programs. Staffs from DIA usually work with staff from PMO in the SWGs. Under the guidance of PMO, DIA will carry out the following activities:

- a. Overall management --
 - I) Assist SWGs in project preparation and implementation;
 - II) Keep all project preparation and implementation documentation for audit by the audit agency during annual performance audit and for the annual verification by the Bank,
 - III) Input data into (monitoring and information system) MIS in a timely manner and generate various project progress reports; and
 - IV) Review project implementation status and report identified problems to SWGs.
- b. During project Preparation --
 - I) Prepare work plan with SWGs for each Biennial Program;
 - II) Assist SWGs in publicizing the sector plan;
 - III) Assist SWGs in training manufacturers, local experts, and general contractor(s) if needed;
 - IV) Review project application submitted by manufacturers;
 - V) Assist SWGs to organize experts to help manufacturers in preparing project proposals and feasibility study,
 - VI) Assist SWGs to organize experts to help manufacturers in evaluating project proposals and feasibility study; Assist SWGs to organize experts to provide technical support to manufacturers during project implementation
 - VII) Supervise expert activities and verify its working load and cost, and report to the SWGs accordingly; and
 - VIII) Assist SWGs in project appraisal.
- c. During project implementation --
 - I) Prepare ODS phase-out contracts and its annexes;
 - II) Review project implementation status and verify the progress report submitted by beneficiary manufacturers and general contractor through plant visits;
 - III) Review of payment applications submitted by beneficiary manufacturers, and submission of applications to sector team;
 - IV) Assist PMO to select the procurement agency and review the procurement organized by the procurement agency in conform with the agreed procedures;
 - V) Assume responsibility for supervising equipment destruction and maintain relevant data and information;
 - VI) Assist PMO in selecting general contractors for sub-projects, if needed, including:
 - Advertise the procurement notices in specified newspaper;

- Organize local experts to prepare bidding document for general contractor and submit to PMO for approval;
 - Invite bids, organize bid opening and bid evaluation;
 - Prepare bid evaluation reports and submit to PMO for approval;
 - Prepare contract for general contractor and sign the contract with the winning bidder together with FECO and manufacturers;
- VII) Review payment requests from project beneficiaries and general contractors, and prepare disbursement requests to FECO;
- VIII) maintain project documentation and coordinate sector teams to provide all information necessary for financial and performance audit, and assist audit agency whenever necessary,
- IX) Organize necessary training for manufacturers,
- X) Assist PMO in implementing TA projects.
- d. Reporting
- I) reporting on technical, financial, procurement, and management problems occurred during project implementation in a timely manner, and submission of reports to PMO with recommendations to solve problems;
 - II) compilation of progress reports on manufacturer activities;
 - III) preparation of project completion reports and commissioning report and,
 - IV) input of information into the MIS in a timely manner on the status of implementation of manufacturer projects.
92. The World Bank plays a major role in assisting developing countries to meet their obligations as Parties to the Montreal Protocol. The Bank partners with developing countries in its role as an implementing agency for the Multilateral Fund. The World Bank and China began their partnership on Montreal Protocol program in 1993 to help China meet its national phase-out obligations. The WB is responsible for a range of activities specified in the project document along the lines of the following:
- a. assisting China in preparation of the Biennial Programs;
 - b. verifying for the Executive Committee that consumption of the substances have been eliminated in accordance with the targets;
 - c. providing a verification report to the Executive Committee bringing evidence that the targets have been met and associated annual activities have been completed as indicated in the Biennial Program;
 - d. ensuring that achievements in previous Biennial Program are reflected in future Biennial Programs and will serve as the progress report;
 - e. Reporting on the implementation status of all previous years' Biennial programs activities will be included in Biennial Program.
 - f. carrying out supervision missions;
 - g. helping China to set up an operating mechanism to allow effective and transparent implementation of the Biennial Program;
 - h. co-coordinating the activities of the co-coordinating Implementing Agencies, if any;

- i. ensuring that disbursements made to China are based on the use of the indicators; and
- j. Providing China with the necessary policy, management and technical support.

5. Monitoring and Evaluation

- 93. PMO is the core organization for monitoring the implementation of Biennial Programs with the responsibility for reporting to the World Bank. PMO will be responsible for tracking the implementation of policy measures and the technical assistance activities; submit progress reports to the Bank every quarter. PMO will also report on specific issues if requested.
- 94. DIA will oversee the progress of Biennial Programs, and submit written reports to PMO quarterly.
- 95. The implementation status of all activities in Biennial Programs will be reported to ExCom once a year during preparation of following year's Biennial Program, and at other times if specifically requested.
- 96. There are two means for monitoring and evaluating the implementation of ODS PA phase-out plan.

A) Verification

- 97. The Bank will conduct an independent verification annually to verify CFCs consumption and conversion activities. The Bank will supervise the implementation of Biennial Programs and will have access to any ongoing or completed manufacturers for spot checks of the records of projects, including random factory visits. The Bank will also carry out such additional verifications as are required by the ExCom.

B) Audit

- 98. There will be an annual financial audit of the ODS Phase-out Account at SEPA, conducted by an independent audit agency acceptable to the Bank, and a performance audit, also by an independent audit agency acceptable to the Bank.

Chapter 8 Action Plan

99. This Chapter presents the Action Plan and schedule for implementing CFCs phase-out for the pharmaceutical aerosol sector. This is a rolling plan where the impact of a Biennial Program can be spread over subsequent years. Every Biennial Program will provide detailed progress of all program activities of previous years, including policy implementation, manufacturer activities and technical assistance activities. The proposed Action Plan is summarized in table 8-1.

Table 8-1 Phase-out Targets and Funding Request from 2007 to 2010 in Action Plan

Line		Baseline (average of 03-05)	2007	2008	2009	2010
1	CFCs Consumption (newly produced CFCs)	485.089	485.089	0	0	0
2	CFCs from Stockpiled CFCs	0	0	1/	1/	1/
3	Total CFCs Consumption	485,089	485.089	0	0	0
Funding Request(US\$'000)						
4	Enterprise-Level Activities ^[1]		11,780		3,047	
5	Technical Assistance Activities		900		200	
6	Support Cost		951		244	
7	Total MLF Cost		13,631		3,491	

1/. Use of stockpiled CFCs as needed during the conversion.

1. Biennial Program

1). 2007-2008 Biennial Program: The following activities will be covered under this program:

- Substitute screening. To support manufacturers to identify substitutes for their aerosol products before the first half year of 2007.
- Registration Application. To support the registration for new CFCs-free aerosol products.
- Modification of Existing Facilities, Validation and New Production.
- Workshops, trainings and public awareness promotion.
- Development of a MIS system and other TA activities as necessary.
- Verification on CFCs consumption;

3). 2009-2010 Biennial Program: This will be submitted to the last ExCom meeting of 2008. It will consist of the following, but not limited to:

- Registration Application. To support the registration for new CFCs-free aerosol products.
- Modification of Existing Facilities, Validation and New Production.
- Workshops, Trainings and public awareness promotion.
- Verification on CFCs consumptions, including final verification of all phase out targets under the sector plan.
- Project Completion Report covering all sector plan activities will be prepared.

Implementation Schedule

Stage	Activities
Start-up	To complete policy development and substitute screening
Registration Application	To complete registration for new aerosol products. Registration application for new aerosol, if possible, will be initiated in the first year.
Production	To complete modification on the existing facilities, validation for production process and training for staff.
Commissioning	To undertake project commissioning organized by SFDA and attended by SEPA, the World Bank and DIA. All the original record, report and related documents should be retained.

Table 8-2 Implementation Schedule

Process \ Year	2007				2008				2009				2010			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Start-up	X	X	X	X												
Registration Application	X	X	X	X	X	X	X	X	X	X						
Production	X	X	X	X	X	X	X	X	X	X	X	X				
Acceptance													X	X	X	X

Annex I. Incremental Cost for Pharmaceutical Aerosol Manufacturers

Enterp . ID	Enterprise Name	Chinese Share (%)	Line Type	CFCs Baseline (kg)	SA Prod. Quantity (can)	CA Prod. Quantity (can)	Incremental Capital (USD '000)					IOC	Subtotal	Adjusted Total
							Substitute Screening	Dossier Preparation	Modification	Validation	Training			
01	Wuxi Shanhe No.1	100%	A, B	823	26,667	0	88	150	102.5	75	35	8.62	459	459
02	Beijing Haiderun Pharmaceutical Co., Ltd	100%	-	0	0	0	131	225	0	0	0	0.00	356	356
03	Guangzhou Baiyunshan Hejigong	100%	-	0	0	0	131	243.75	0	0	0	0.00	375	375
04	Externally Applied Agent Factory of Guangzhou Baiyunshan	100%	-	0	0	0	44	75	0	0	0	0.00	119	119
05	Guiyang Dechangxiang Pharmaceutical Co., Ltd	100%	A	13	0	100	44	93.75	63.75	37.5	17.5	0.08	256	256
06	Beijing Double-Crane Modern Pharmaceutical Technology Co., Ltd	100%	-	0	0	0	44	75	0	0	0	0.00	119	119
07	Beijing Tongrentang	100%	B	14	0	1,267	131	262.5	38.75	37.5	17.5	1.04	489	489
08	Xinyi Pharmaceutical General Plant	100%	-	0	0	0	131	243.75	0	0	0	0.00	375	375
09	Fujian Nanshaolin Pharmaceutical Co., Ltd	100%	A	10,684	48,571	0	88	150	63.75	37.5	17.5	15.71	372	372
10	Shanghai Fuxingzhaohui	100%	-	0	0	0	44	75	0	0	0	0.00	119	119
11	Penglai Nuokang Pharmaceutical Co., Ltd	100%	A	3,491	100,600	0	44	75	63.75	37.5	17.5	32.53	270	270
13	Hubei Nanyang Pharmaceutical Co., Ltd	70%	A	49,393	1,171,333	0	44	75	63.75	37.5	17.5	378.77	616	431
14	Shenyang Jingcheng Pharmaceutical Co., Ltd	50%	A	57,717	968,533	0	44	75	63.75	37.5	17.5	313.20	551	275
15	Harbin Hengchang Pharmaceutical Co., Ltd	100%	-	0	0	0	44	75	0	0	0	0.00	119	119
16	Pharmaceutical Plant of Hunan Bencao	100%	B	1,300	58,333	0	44	75	38.75	37.5	17.5	18.86	231	231
17	Shandong Bencao Pharmaceutical Co., Ltd	100%	B	428	0	56,720	88	187.5	38.75	37.5	17.5	46.54	415	415
18	Shandong Jewim Pharmaceutical Co.,	100%	A	12,080	276,314	41,967	131	262.5	63.75	37.5	17.5	123.79	636	636
19	Suizhou Pharmaceutical Co. Ltd.	100%	B	13	700	0	88	150	38.75	37.5	17.5	0.23	331	331
20	Guizhou Antai Pharmaceutical Co., Ltd	100%	A	20,827	580,000	0	88	150	63.75	37.5	17.5	187.56	544	544
21	Guizhou Xinyi	100%	A	229	8,333	0	44	75	63.75	37.5	17.5	2.69	240	240
22	Hangzhou Sino-US Huadong	75%	-	0	0	0	44	75	0	0	0	0.00	119	89

Enterp . ID	Enterprise Name	Chinese Share (%)	Line Type	CFCs Baseline (kg)	SA Prodt. Quantity (can)	CA Prodt. Quantity (can)	Incremental Capital (USD '000)					IOC	Subtotal	Adjusted Total
							Substitute Screening	Dossier Preparation	Modification	Validation	Training			
23	Xinjiang Biochemistry Pharmaceutical Co., Ltd	100%	A	2,592	0	50,000	44	93.75	63.75	37.5	17.5	41.03	297	297
24	Yunnan Baiyao Group Corporation	100%	A	273,333	5,306,667	0	44	75	63.75	37.5	17.5	1716.02	1,954	1,954
25	Chongqing Kerui Pharmaceutical Co., Ltd	100%	-	0	0	0	88	168.75	0	0	0	0.00	256	256
26	Huayi Pharmaceutical Co., Ltd	100%	B	380	0	70,000	44	93.75	38.75	37.5	17.5	57.44	289	289
27	Zhanjiang Xintongde Pharmaceutical Co., Ltd	100%	A	29,397	1,036,667	203,333	306	562.5	63.75	37.5	17.5	502.07	1,490	1,490
28	Heilongjiang Tianlong Pharmaceutical Co., Ltd	100%	A,B	300	0	33,333	219	412.5	102.5	75	35	27.35	871	871
29	Guizhou Hongyu Pharmaceutical Co., Ltd	100%	A	1,230	2,800	74,133	88	168.75	63.75	37.5	17.5	61.73	437	437
31	Guangzhou Dongkang Pharmaceutical Co.	100%	-	0	0	0	44	93.75	0	0	0	0.00	138	138
32	Shanghai Yishengyuan Pharmaceutical Co., Ltd	100%	B	112	4,845	0	44	75	38.75	37.5	17.5	1.57	214	214
37	Nantong Zhongbao Pharmaceutical Co., Ltd	100%	-	0	0	0	88	150	0	0	0	0.00	238	238
39	Anshan No.1 Pharmaceutical Plant	100%	-	0	0	0	175	356.25	0	0	0	0.00	531	531
30	Sanpu Pharmaceutical Co., Ltd	100%	-	13	1,700	0	0	0	0	0	0	0	0	0
33	Sanjing Pharmaceutical Co., Ltd of Harbin Pharmaceutical Group	100%	A	145	0	15,210	0	0	0	0	0	0	0	0
34	Hubei Lishizhen Medical Group Co., Ltd	100%	A	137	86,667	0	0	0	0	0	0	0	0	0
35	Shannxi Fengwuchendayaotang	100%	A	48	0	6,000	0	0	0	0	0	0	0	0
36	Harbin Guangji Pharmaceutical Factory	100%	-	0	0	0	0	0	0	0	0	0	0	0
38	Xian Lisheng Pharmaceutical Co., Ltd	100%	-	0	0	0	0	0	0	0	0	0	0	0
12	Glaxo SmithKline (Tianjin)	0%	A	20,390	0	1,216,000	0	0	0	0	0	0	0	0
	Eligible for MLF Fund						2,756	5,119	1,203	825	385	3,537	13,824	13,334
													Deductio n	-490

PROJECT COVER SHEET – MULTI-YEAR PROJECTS

COUNTRY: China, People Republic of.

PROJECT TITLE

BILATERAL/IMPLEMENTING AGENCY

Halon Sector Phase-out Plan	WORLD BANK
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NATIONAL CO-ORDINATING AGENCY: STATE ENVIRONMENTAL PROTECTION AGENCY

LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT

A: ARTICLE-7 DATA (ODP TONNES, 2004, AS OF SEPTEMBER 1, 2006

Annex A, group I (CFCs)	25,264	Annex B I (CFC-13)	20.7
Annex A, Group II (Halons)	3,423.6	Annex B ii (CTC)	3,885.8

B: COUNTRY PROGRAMME SECTORAL DATA (ODP TONNES, 2005, AS OF SEPT. 2006

ODS	Foam	Ref.	Aerosol	ODS	Solvents	Process agent	Fumigant
CFC-11	8,418.051	1,186.000	297.000	CFC-113	1,360.690	13.500	
CFC-12	116.000	5,285.064	845.000	CTC		3,532.510	
CFC-115		316.957		MCI	3,701.957		
				MBr			519.729

Halon production and consumption remaining eligible for funding (ODP tonnes)	0
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C: CURRENT YEAR BUSINESS PLAN: Total funding: US\$0.4 million:

Total phase-out impact under the 2007 Annual Program: Production: 0 Consumption: 0 ODP tonnes.

D: PROJECT DATA		2004	2005	2006	2007	2008	2009	2010	Total
Montreal Protocol limits		34,187	17,094	17,094	17,094	17,094	17,094	0	
H-1211 (ODP tonnes)	Annual production limit	5970	5970	0	0	0	0	0	9950
	Annual consumption limit	5670	5670	0	0	0	0	0	9350
H-1301 (ODP tonnes)	Annual production	6000	2000	1000	1000	1000	1000	0	618
	Annual consumption limit	1500	1500	1000	1000	1000	1000	0	618
TOTAL ODS PRODUCTION TO BE PHASED OUT		0	6970	0	0	0	1,000		
TOTAL ODS CONSUMPTION TO BE PHASED OUT			6170	0	0	0	1,000		
Project costs (US \$):									
Funding for lead agency [name]		1.2	1.8	11.4	0.4	0.3	0.1	0	62.0
Total project funding		1.2	1.8	11.4	0.4	0.3	0.1	0	62.0
Support costs (US \$)									
Support cost for lead agency [name]		0.09	0.135	0.855	0.03	0.0225	0.0075	0	
Total support costs		0.09	0.135	0.855	0.03	0.0225	0.0075	0	
TOTAL COST TO MULTILATERAL FUND (US \$)		1.29	1.935	12.255	0.43	0.3225	0.1075	0	
Project cost effectiveness (US \$/kg)		NA							

FUNDING REQUEST: US\$ 400,000.

SUPPORT COST (7.5%): US\$ 30,000

Halon 1301 phaseout schedule has been changes in 2004 as per the APP agreement..

Prepared by: SEPA Halon Sector Team
Reviewed by: World Bank MP Team

Date: August 2006
Date: September 2006

THE HALON SECTOR

2007 ANNUAL PROGRAM

September 11, 2006

State Environmental Protection Administration

Data Sheet

Country	China
Year of plan	2007
# of years completed	9
# of years remaining under the plan	3
Ceiling of Halon 1211 and halon 1301 consumption of the 2006 Annual Program	Halon 1211: 0MT Halon 1301: 100MT
Ceiling of Halon 1211 and Halon 1301 consumption of 2007 Annual Program	Halon 1211: 0 MT Halon 1301: 100 MT
Ceiling of halon 1211 and halon 1301 production of 2006 Annual Program	Halon 1211: 0 MT Halon 1301: 100 MT
Ceiling of halon 1211 and halon 1301 Production of 2007 Annual Program	Halon 1211: 0 MT Halon 1301: 100 MT
Funding requested for the 2007 Annual program	\$ 0.4 million

National Implementing operating agency	State Environmental Protection Administration
International implementing agency	The World Bank

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The Halon Sector 2007 Annual Program

BACKGROUND

1. In accordance with the Executive Committee's approval of the Sector Plan for Halon Phaseout in China (UNEP/OzL.Pro/ExCom/23/68) and the CFC/CTC/Halon Accelerated Phaseout Plan in China (UNEP/OzL.Pro/Excom/44/73) (hereinafter referred to as "APP"), China is hereby requesting release of the tenth tranche of US\$0.4 million for implementation of the year 2007 Annual Program. With this funding, China's halon 1211 production and consumption will remain as 0 MT in 2007. The halon 1301 production and consumption will remain as per the agreed maximum of 100 MT in 2007. Details of the annual program are in Part B. As per the phase-out target of halon 1301, China agrees to phase-out the production and consumption of halon 1301 in compliance with APP instead of the China Halon Sector Strategy. Details are in Table 3.

2. Table 1 below provides an overview over total MLF funding approved and disbursements until July 31, 2006.

Table 1: MLF Funding and disbursement

By July 31, 2006

Annual Program	Proj ID #	MLF funding	Disbursements		
			From Bank to China	Committed MLF funds	Disbursed
1998 AP	PRC/	12,400,000	12,400,000	9,045,846	9,045,846
1999 AP	PRC/	9,700,000	9,700,000	6,262,560	6,262,560
2000 AP	PRC/	10,600,000	10,600,000	12,160,331	12,103,991
2001 AP	PRC/	4,500,000	4,500,000	1,928,552	1,926,052
2002 AP	PRC/	3,700,000	3,700,000	7,079,999	5,997,190
2003 AP	PRC/	5,900,000	5,900,000	2,620,742	2,580,742
2004 AP	PRC/	1,200,000	1,200,000	2,798,714	604,354
2005 AP	PRC/	1,800,000	1,440,000	843,050	141,050
2006 AP	PRC/	11,400,000	400,000	4,147,036	2,910,636
2007 AP					
2008 AP					
2009 AP					
Total		61,200,000	49,840,000	46,886,830	41,572,421

3. In the approval of the 2006 Annual Program for the Halon Sector, the Government of China and the World Bank were requested to consider a cumulative audit of the halon sector as part of the 2006 annual program. As the halon 1211 production stopped by January 1, 2006, phaseout activities should be close to completion. A review has been undertaken and the AP includes an overview over the halon 1211 activities undertaken. The total MLF

funding used for the halon 1211 phaseout activities is shown in the table 2.

Table 2: Summary of grant fund allocation on halon 1211 phaseout activities

By July 31, 2006

	Production Phaseout (in USD)	Consumption Phaseout (in USD)	TA (in USD)	Halon Recycling and Banking (in USD)	Subtotal (in USD)
1998 AP	4,605,879	3,609,338	830,629	0	9,045,846
1999 AP	2,900,375 1,250,000	1,423,888	688,297	0	6,262,560
2000 AP	3,149,553	1,711,629 6,050,000	251,900 85,000 132,249	780,000	12,160,331
2001 AP	1,392,926	385,310	15,0316	0	1,928,552
2002 AP	1,482,000 4,400,000	301,942	824,057	0	7,007,999
2003 AP	816,000	1,578,005	166,737 60,000	0	2,620,742
2004 AP		372,144	134,370 212,200	0	718,714
2005 AP	0	660,000	183,050	0	843,050
2006 AP	3,582,000	0	45,036	0	3,627,036
Total	23,578,733	16,092,256	3,763,841	780,000	44,214,830

4. The Executive Committee of the MLF also encouraged the government of China to limit its halon 1301 production for the purpose of feedstock to the level allowed under the agreement to avoid any future unintentional consumption, which would violate the agreement with the Executive Committee and seek more effective to use more effective non-ODS chemicals if possible. The Government of China has reviewed the request and has the following comments:

- The use of Ozone Depleting Substances as feedstock is not controlled by the Montreal Protocol and as such not by the Agreement.
- SEPA is developing a monitoring and verification mechanism for the use of ODS as feedstock applications and the annual uses will be monitored by the Government and reported to the Ozone Secretariat as part of its annual Art 7. data reporting.
- As the production for feedstock is not controlled by the Montreal Protocol, China does not have the legal authority to neither prevent nor limit such uses of halon as feedstock.

- It would be the responsibility of the companies to assess the feasibility and cost-effectiveness of using non-ODS substitutes. It would be up to the companies to identify alternative and more cost effective technologies and make the production changes at own cost.
5. China has informed the companies using halon 1301 as feedstock and the halon 1301 producer on the request from the Executive Committee.
 6. The agreement between the Executive Committee and China includes a condition regarding expected number of CO2 fire extinguishers to be put on the market during the project as substitute for halon 1211 fire extinguishers when the project would be completed. It was agreed that “after full conversion at least 3.59 million extinguishers produced in China will, in 2005, be either CO2 extinguishers or equivalent fire extinguishers using a technology at least as expensive”. Any shortcomings would evoke a penalty of US\$ 3.08 per unit shortfall of CO2 or equivalent fire extinguishers. With the approval of the Accelerated Phaseout Plan, it was agreed that any penalty would be waived, but the amount could be used for the capacity building. A total of 2.255 million CO2 extinguishers were produced in 2004 and investigation on CO2 extinguisher production of 2005 is still ongoing.
 7. The following provide an overview on the implementation status of the Halon Sector Plan. Detailed information on the halon 1211 program is found Part A.
 8. After the approval of the China Halon Sector Strategy at the 23rd meeting of the ExCom and release of funds for the first (1998) Annual Program, China began implementation of the Halon Sector Strategy. Since the start of the program, China has developed supporting policies and regulations. Out of the initial number of 14 Halon-1211 production plants, all the 14 have been closed and dismantled their production lines completely by the end of June 2006. Only one halon 1301 producer in China continues to retain its production capacity. Actual production has consistently remained within the program limits.
 9. Out of a total of 72 halon 1211 fire-fighting extinguisher manufacturers originally identified as potential beneficiaries, 14 enterprises have signed contracts to close their extinguisher production, and 47 enterprises have signed contracts to convert their manufacturing lines for fire extinguishers from halon to non-ODS fire extinguishers. All the 61 enterprises have completed their closure/conversions projects. Additional four halon 1211 fire-fighting extinguisher manufacturers operating without valid MPS licenses were identified and located in 2001. They were accordingly shut down in 2001 by administrative measure without any funding. Out of a total of 22 originally identified halon 1211 fire fighting systems manufacturers, 14 enterprises have signed contracts to convert their manufacturing of halon fire extinguishing systems from halon to non-ODS extinguishing systems; 12 of these have been completed, and the contracts for the other two were terminated by SEPA due to legal and financial issues. Based on review of the status of licensed halon 1211 fire equipment companies, it has been found that the remaining eligible 11 halon 1211 fire-fighting extinguisher manufacturers and the remaining 8 eligible halon 1211 fire extinguishing system manufacturers has either closed down or merged with other companies. When the projects for the above-mentioned halon 1211 enterprises were

completed, closed down or terminated, their halon 1211 manufacturing and sales licenses were withdrawn by MPS accordingly. As addressed in the following, halon 1301 fire fighting extinguishing system manufacturers will be addressed from 2006 and onward.

10. A total of 63 technical assistance activities have been planned as of the 2006 annual program. These TA activities include activities for strengthening implementation capacity for the Sector Plan, and preparing standards to ensure quality and reliability of halon substitute fire extinguishers and fire extinguishing systems. 44 out of 63 TA activities have been completed, 8 are ongoing and 11 cancelled of various reasons.

11. The national halon 1211 production level allowed for 2006 is 0 MT. Compared to the actual production level of 11,644 MT in 1997, the baseline year for the halon sector, a total reduction of 11,644 MT has been made. The ceiling allowed for halon 1301 production for 2006 is 100 MT, a reduction of 518 MT from 1997 baseline level of 618 MT. It is estimated that at least a total production of 55,185 tons of halon 1211 of 2,729 tons of halon 1301 have been prevented from 1998 to 2004 through the halon phase-out program. A detailed implementation status is provided in Part A.

12. Despite the higher costs of halon 1301 substitutes, the reduction in demand for halon 1301 can be assigned to the policies introduced and availability of new substitutes such as inert gases and HFC-227ea now available in China. Some of the chemical producers have invested in the development of HFC-227ea production facilities and has started production and sale of HFC-227ea. The introductions of new, but more costly substitutes, are supported by a number of TA activities and new standards and design codes.

13. As far as the other halons are concerned, halon 1202 is generated as a by-product during the production of halon 1211. According to information provided by the larger halon 1211 producers, the amount of halon 1202 generated averages between 20 and 30 kg per ton of halon 1211 produced. This halon 1202 is neither vented, nor sold, but is recycled into halon 1211 production. The ban on sales of halon 1202 in the market has been promulgated by the Ministry of Public Security (MPS) in February 1998. Based on its regulations and monitoring measures, China is confident that there is no halon 1202 sold in the market. China has never produced halon 2402, and has never had plans to do so. In accordance with national regulations, a new halon 2402 production facility would require a new production license, and such a license can no longer be obtained because of the ban on setting up new halon production facilities or expanding existing halon production facilities effective on November of 1997.

14. These phaseout results have been achieved through close cooperation between the State Environmental Protection Administration (SEPA), the Ministry of Public Security (MPS), China National Chemical Construction Corporation (CNCCC), and the concerned enterprises. The experience from the implementation has confirmed the necessity of strong policy enforcement and monitoring of the halon phaseout program. Because of the number and geographical distribution of the enterprises involved, the success of the program depends to a large extent on the cooperation and support from provincial and local Environmental Protection Bureaus and Fire Fighting Bureaus. Training and public awareness therefore

continue to be key elements in the halon sector plan implementation.

15. The rapid reduction of halon 1211 makes it imperative and important for fostering the supply of alternative fire extinguishing agents and fire fighting equipment in order to maintain the national fire protection and fire fighting capability. Special initiatives have been taken up to strengthen the supply of light-weight high pressure CO₂ cylinders, ABC powder, and vegetable protein foam. A halon bank (Guangdong Halon Recycling Center) was established in Guangdong. Details of these initiatives are provided in Part A.

16. The production and consumption of halons in China since the start of the Halon Sector Plan is shown in Table 3 below. Consumption in this table was determined in accordance with the ExCom approval conditions as total annual production plus imports, minus exports. As indicated above, China has reported that no other halons were produced in China, including halon 1202 and halon 2402.

17. Starting from 2003 halon 1301 is also used as feedstock for producing pesticide, pesticide intermediate and pharmaceutical intermediate. As per the Montreal Protocol, controlled production of halon 1301 is defined as actual production minus amount used as feedstock. Hence, the annual production as per this agreement is defined as total annual production minus amount used as feedstock in the same year. The status of the use of halon 1301 as a feedstock has been confirmed and verified by SEPA. A total of 162.9 tons of halon 1301 were procured from ZCRI in 2004 and 277.02 tons in 2005 and used as feedstock in 2004 and 2005. The demand for halon 1301 as feedstock has increased rapidly since 2003..

18. All production and consumption data as of the year of 2005 has been verified by an annual international audit commissioned by the World Bank.

Table 3: Annual Production and Consumption of Halons under the Sector Plan (ODS MT)

	Halon 1211				Halon 1301			
	Production		Consumption		Production		Consumption	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
1997 (baseline year)	9,950	11,644	NA	10,849	618	618	NA	NA
1998	7,960	7,842	7,160	7218	618	450	300	-152 ^{1/}
1999	5,970	5,965	5,370	5,280	618	484	300	304
2000	3,980	3,978	3,580	3,650 ^{2/}	618	428	300	377 ^{2/}
2001	3,317	3,117	3,117	2,832	618	213	300	180
2002	2,654	2,469	2,654	2,284	600	0	150	-36
2003	1,990	1,884	1,890	1,692	600	0	150	-26
2004	1,990	1,068	1,890	833	200	22	150	-26
2005	1,990	1,276	1,890	1,046	200	165	150	131
2006	0		0		100		100	
2007	0		0		100		100	
2008	0		0		100		100	
2009	0		0		100		100	
2010	0		0		0		0	

^{1/} The negative consumption of Halon 1301 in 1998 (-152 MT) reflects the export of 602 MT, which included part of the stock (328MT) from the previous year's production. Therefore, the total consumption in 1998 (Consumption=Production +Import - Export) is negative.

^{2/} Remedial action for the excess consumption in 2000 was taken by appropriately reducing consumption quota in 2001.

Table 4: Halon 1301 phase-out targets under the Sector Plan

In ODS tones		2004	2005	2006	2007	2008	2009	2010
APP	Max allowable halon 1301 production	200	200	100	100	100	100	0
	Max allowable halon 1301 consumption and export	150	150	100	100	100	100	0
China Halon Sector Strategy	Halon 1301 production	600	600	150	150	150	150	0
	Halon 1301 consumption	150	150	100	100	100	100	0

Part A

Implementation Status of Previous Annual Programs

1998-2005 Annual Programs

1. ***Phaseout targets and objectives.*** As described in Table 1, production and consumption of halons has been reduced annually under the halon sector agreement. While production has consistently been retained below the agreement levels, the consumption of halons (production adjusted for net export) exceeded the targets twice (for 1998 and 2000) as exports of halons turned out to be lower than expected. This was only discovered when the final export figure became available to SEPA in the beginning of the following year. These developments were promptly reported to the ExCom, and corrective measures were taken as follows:
 - (a) Reduction of excess consumption from the next year's consumption limit (for 2000);
 - (b) Confiscation of excess production to not allow its consumption within the following year (described in detail in the 2001 annual program); and
 - (c) Strengthening the controls on the national consumption target from 2001 onwards by limiting the initial total national production quota to the consumption target for the year. Any additional production quota (for export) can only be requested retroactively, so that an enterprise requesting such additional quota would have to provide documentation to prove that the export has already taken place.
2. The consumption data for 2001, 2002, 2003, 2004 and 2005 confirms the effectiveness of this arrangement.
3. ***Implementation of policy instruments.*** The production quota regulations became effective in December 1997. National annual halon production quotas are issued to individual producers for halon 1211 and halon 1301.
4. The quota system is the main tool for the implementing the halon phaseout and is supported and enforced fully by Ministry of Public Security (MPS). The production data reported by the producers is periodically verified by SEPA and MPS. MPS has simultaneously strengthened its enforcement of the regulation on use of halon 1211 fire extinguishers, which has further reduced the demand for halon 1211. As described above, the halon quotas are now administratively split up into production quotas for domestic consumption and for export. Utilization of the export component is only allowed retroactively, and requires proof of export orders having been carried out. Licensing is another important control measure. Only licensed enterprises are allowed to produce and/or sell halon and/or halon containing products. After a halon closure/conversion project is completed, the enterprise's production license for halon and/or halon containing products is withdrawn by MPS.
5. There is also a ban on production and sale of halon and/or halon-containing products to enterprises that have been funded and completed projects under previous annual

programs. When the conversion is completed and the project is commissioned by MPS and SEPA, the license to produce and sell halon fire extinguishers and systems are withdrawn.

6. In order to support the implementation of the halon phaseout, revision of existing and development of new standards for substitute technologies played a very important role. Standards were developed as a substantial part of the technical assistance program. The table below gives an overview over the standards and design codes revised and new developed to facilitate halon phaseout.
7. The two main institutes for development of standards and testing are Shanghai Fire Research Institute and Tianjin Fire Research Institute. The Shanghai main working area is testing of fire extinguishers and Tianjin Fire Research Institute expertise is in fire extinguishing agents and fire fighting systems. Both Institutes are semi-governmental institute under Ministry of Public Security

Table 5: Testing, component and design standards developed under the program

	New standards		Revision of	
Number of standards developed/revised	Developed	Issued by MPS,MC and/or GAQSIQ*	Revision completed	Issued by MPS, MC and/or GAQSIQ
15	12 (3 not yet completed)	10	3	3

GAQSIQ: General Administration of Quality Supervision, Inspection and Quarantine

MC: Ministry of Construction P.R. China

8. The development of revisions of existing and development of new standards and design standards include laboratory and testing work to evaluate new alternatives, evaluate testing methods to ensure repeatability, accuracy etc. A technical group is established to follow the work and review the technical reports and draft standards. When the draft standard method is ready, it is submitted to the National Standard Committee who conducts a final review and adopts the proposed standard as a national standard. Annex V include the name and standard number of the national standards developed and issued. When the work is completed, the contractor for the TA submit the draft standards, a report on the work carried out and a PCR to the Halon Team at SEPA who commission and accept the project and the completion report.

Enterprise-level phaseout activities

9. **Closure of 1211 halon production facilities.** The halon 1211 reached its maximum production level in 1997 with a production of 11,644 MT (34,932 ODP tons). By December 2005, all the halon 1211 production facilities listed in the Halon Sector Plan have been closed down and dismantled at a cost of close to US\$ 20 million.

10. The selection of halon 1211 producers for quota reduction and closure contracts were in the first couple of years of the program based on bidding where the producers offering the lowest halon production phaseout cost per tons would be the winners. When only a few producers were left, nobody was willing to reduce or stop the halon production and reduction and quota reduction contracts were based on prorated production reduction contract dictated by SEPA as mandated by the quota regulation system.
11. Full closure contracts were signed with bid winning halon producers in various annual programs. Their production facilities were dismantled and halon-producing equipment was completely dismantled and disposed. Partial closure contracts (quota reduction contracts) were also signed with some bid winners and their production quota, and in some cases, capacity was reduced accordingly. Details by year are provided in Annex II.
12. In order to ensure substitute fire extinguishing agents for halon 1211, projects for setting up additional ABC powder production capacity (HAL-99-SI-01) at one of the previous halon 1211 producers and AFFF production capacity (HAL-02-SI-03) at a producer with domestic developed foam technology are established. For further details, see the section on special initiatives.
13. **Closure and conversion of halon 1211 fire equipment manufacturers.** China has conducted an assessment of the number of contracts that have already been signed in the first three years for closure and conversion of equipment manufacturers to review whether the pace of conversion is appropriate, given the projected availability of halon 1211 in the next three years. This assessment has been concluded. The contracts were signed under each annual program with fire extinguisher and fire extinguishing system manufacturers for reducing halon 1211 consumption to match the declining supply of halon 1211. Of the 72 halon fire extinguisher manufacturers and 22 halon 1211 system manufacturers with production license from Ministry of Public Security, 61 extinguisher and 14 system manufacturers were funded under the Sector Plan. In addition to the 72 companies, four fire extinguisher manufactures were found producing based on licenses from the provincial government. Their licenses were withdrawn and the companies changed to other substitutes at their own cost. Some of the extinguisher manufacturers selected closure and the other selected conversion. 61 extinguisher manufacture closure and conversion activities have been completed on schedule and were commissioned by SEPA and MPS. Details are provided in Annex III.

Table 6: Conversion of the fire protection industry to change away from the manufacturing of halon 1211 fire equipment.

Total # of companies	Funded under the Halon Sector Plan			Closed/converted without funding
	Subtotal	Closure	Conversion	
76 Fire extinguisher manufacturers	61	14	47	15
22 halon 1211 fire extinguishing system manufacturers	14	0	14	8

14. Supply of CO₂ cylinders for CO₂ fire extinguishers turned out to be a challenge. The quality of CO₂ cylinders produced by small fire extinguishing companies did not meet the national and international standard for high pressure cylinders. In addition, the cost of setting up production CO₂ cylinder production lines by smaller fire equipment companies would be too high and not be financial viable. In order to overcome the problem, China decided to support the set up a production facility for light weight high pressure CO₂ cylinder production facility (HAL-00-SI-04) and to support some of the larger producers of CO₂ cylinders and fire extinguishers (HAL-05-SI-03). The use of light weight cylinders are now rapidly increasing. The activities are described in the section on special initiatives.

Technical assistance (TA) activities

15. All activities under TA projects of 1998 to 2005 have been completed except two in 2002, two in 2003, two in 2004 and one in 2005, which are still ongoing. Details of all these activities are in Annex V (A-E).

Halon Recycling and Banking

16. Both due to the significant amount of halon 1211 stored in millions of halon 1211 fire extinguishers and the stop of halon 1211 production, halon recovery and recycling will be an important issue during the coming years. Based on the last 9 year of halon 1211 domestic consumption, a total of about 35,000 MT has been put into the market. The total amount of halon 1211 stored in fire extinguishers and systems might be significant. The Chinese sector standard for halon 1211 fire extinguisher requires that ten year old extinguisher should be retired from the market. Hence significant number of halon fire extinguishers will be retired over the coming years and large amount of halon 1211 will have to be recovered in order to avoid venting.
17. A number of studies and demonstration projects have been carried out in order to address the issue of collection and recycling of halons:
 - a. Halon Overall Management Plan and Banking study carried out in 1998-2000 estimated the amount of halon 1211 available for recycling and how to organize on a national scale. (HAL-98-TA-6)
 - b. Development of disposal standard for disposal of halon 1211 fire extinguishers (HAL-99-TA-6)
 - c. Demonstration projects in provinces and municipalities of Liaoning, Guangdong, Beijing and Shanghai, (HAL-98-TA-5, HAL-98-TA-8, HAL-99-TA-8, HAL-02-TA-8)
 - d. A halon recycling center was established in Guangdong province. (HAL-99-TA-9 and Special initiative HAL-00-SI-03).
18. Halon recovery and recycling are seen as one of the key elements of successful implementation of the Halon Sector Plan and eliminating the production of halon 1211. The Sector Plan stipulated setting up of provincial and regional collection centers for halon extinguishers and regional halon 1211 recycling centers. As part of the 1998 Annual Program, as study on a proposal for an overall halon management plan were

initiated and carried out by Shanghai Fire Research Institute. A final plan was developed and submitted to the SEPA and MPS. The Plan included setting up collection centers and recycling facilities and were presented and discussed with the HTOC at a workshop in Beijing in November 1999.

19. Four demonstration projects were initiated from 1998 to 2004. Two in the cities of Beijing and Shanghai and two in the provinces of Liaoning and Guangdong. Among these projects various activities were carried out such as survey for halon extinguisher and system production and applications, development and issue of local policy and regulation for production, sale, maintenance and management of halon products, use of various means to publicize the knowledge of ozone protection to promote public awareness, establishment of a monopoly on sales and maintenance of halon fire equipment. Through above activities, halon phaseout work in these provinces and cities was greatly promoted.
20. ***Establishment of Guangdong Halon Recycling Center.*** The Panyu Shengjie Fire-fighting Equipment Co., Ltd. was selected as the beneficiary to set up a halon recycling center for Guangdong Halon Bank with an annual recycling capacity as 500 MT. The center is able to recycle both halon 1211 and halon 1301. The grant contract was signed in August 2000 and the project has been completed and commissioned in July 2004. The halon Recycling Center started operation and recycled small quantities of halon 1211.
21. Unfortunately, it was found that the halon 1211 in some extinguishers was mixed with other chemicals. As the recycling equipment can only remove water contents and particles, but not separate halon from other chemicals, the operation stopped. The recycling center is now adding a distillation column to its facility so that it can separate contaminants from halon 1211. It is expected that the halon recycling center will be operational after the distillation column was added.
22. Halon 1211 is now in shortage in other part of the world and Chinese recycled/reclaimed halon 1211 could be the main source for the foreseeable future. It seems therefore that the halon 1211 recycling center could be commercial viable. The recycling center will set up a website through which the international buyers can reach it. The halon recycling center will be in normal operation in 2007.
23. MPS and SEPA are presently reviewing the halon management plan developed in 1998 to 2000 and updating them in order to avoid unnecessary venting of halon 1211. China will ensure that halon 1211 is recovered and reused in essential places or stored for future uses through strict monitoring. The possibility for converting surplus halon 1211 into other useful chemicals is under consideration.

Special Initiatives

24. Another main objective of the Halon Sector Plan is to ensure that the level of fire protection capability in China is not compromised as a result of halon phaseout activities, and that adequate quantities of suitable quality substitutes are available. Special initiatives have been implemented under various annual programs to achieve this

objective. The special initiatives undertaken so far are summarized in Annex VI and described below. In addition, some fire equipment companies and chemical producers have at own costs introduced new halon substitutes for both halon 1211 and halon 1301 into the Chinese market.

25. **ABC dry chemical powder.** To maintain the required level of fire fighting capacity in China and promote the use of ABC powder, the Foshan Electro-chemical General Plant was selected to establish an ABC dry powder production line with an annual capacity of 3000 MT. The grant contract was signed in May 1999 and the project has been completed and commissioned in November 2001. Commercial production has already started, and the production of ABC powder was 1544.75 MT in 2002, 3013.9 MT in 2003 and 3406.85MT in 2004. Foshan Electro-chemical General Plant expanded the capacity from 3000mt/y to 10,000mt/y using their owe money in 2004.
26. **Light weight high pressure CO₂ cylinders.** Weifang Dongming Fire-fighting Equipment Co., Ltd. was selected as the beneficiary for producing light weight CO₂ cylinders with a capacity of 600,000 units per year. The contract was signed in November 2000, completed at the beginning of 2004, and commissioned by SEPA in September 2004. The commercial production started in 2004. The production of cylinder for CO₂ fire extinguishers was 379,051 units in 2005.
27. **Halon banking (Establishment of Guangdong Halon Recycling Center).** The Panyu Shengjie Fire-fighting Equipment Co., Ltd. was selected as the beneficiary to set up a halon recycling center for the Guangdong Halon Bank with an annual recycling capacity of 500 MT. The grant contract was signed in August 2000, and completed and commissioned in July 2004.
28. **Establishing the laboratory for plant-protein based foam.** The Dalian Honsen Hi-tech Co. Ltd. was selected as the beneficiary to establish a test laboratory for plant-protein-based foam. The contract was signed in August 31, 2000. The project has been completed & commissioned in October 2002.
29. **National conference.** A national halon conference was held in November, 2000, and was attended by various institutions and entities related to halon phaseout activities. The conference provided a valuable opportunity to look back on experiences and lessons, look forward to future tasks, and to share the lessons of successful experience.
30. **Development of 3,600 MT plant-protein foam fire fighting agent production line.** Dalian Honsen Hi-tech Co., Ltd. was selected as the beneficiary to set up the production line of 3,600 MT/y Honsen L119 plant-protein based foam. The contract was signed in October 2003. While the overall designed plant capacity is larger at 10,000 MT, the special initiative will only support this limited capacity in keeping with the requirement in the agreement between China and the Excom “ China understands, consistent with Executive Committee rules, that it has a responsibility to ensure that it will not use Fund resources to build aggregate capacity for the production of substitute chemicals or substitute extinguishers that exceeds that capacity (for Halon 1211, 17,800 tons; for Halon 1301, 1000 tons; and for halon fire extinguisher production capacity of 7.71 million units.” They

have finished the installation of equipment in August, 2006. The pilot production is expected to start by the end of September, 2006 in Dalian.

31. ***Survey for CO₂ extinguisher production.*** A new special initiative project was added into the 2003 annual program. This project focused on obtaining the information of exact production capacity and sales of CO₂ extinguisher and other extinguishers with clean fire extinguishing agent in China during 1998-2002. Shanghai Fire Research Institute finished the survey in September 2003. The project was commissioned in May, 2005.
32. ***Establishment of a national/trade standard of hexafluorapane extinguishing agent and its testing methodology.*** This project aims to establish a national/trade standard of HFC-236fa extinguishing agents and establish testing method of HFC-236fa extinguishing agents. The TOR of the project has been agreed by World Bank. The bidding was finished and the evaluation report was submitted to WB in Aug. 2004. Tianjin Fire Research Institute has been selected to carry out the project. The contract was signed in August 2005. The draft standard has been circulated for comments and the project is expected to be completed in 2007.
33. ***Development of Hexafluoropropane Fire Extinguishers.*** Hexafluoropropane (HFC-236fa) is a halon 1211 substitute, it has a good fire extinguishing performance, its ODP is 0 and it is already marketed internationally by abroad companies. This project aims to develop a portable Hexafluoropropane fire extinguishers as one of halon substitutes and to give out the parameters such as the kind and mass or pressure of propellant, fill density, designing data of the cylinder, operating temperature ranges, effective discharge time, bulk range and class of fire. The TOR of the project has been agreed by the World Bank. The bidding process was finished and the evaluation report was submitted to WB in Aug. 2004. Shanghai Fire Research Institute has been selected to carry out the project. The contract was signed in August 2005. The project is going on.
34. ***Expansion of the production of CO₂ extinguisher.*** In order to encourage the extinguisher producers to produce clean extinguishers to replace Halon extinguishers, SEPA will use some of the funds from the Halon sector plan to encourage the CO₂ extinguisher producers to expand their capacity of CO₂ extinguisher production. Contracts have been signed with three CO₂ fire extinguisher manufactures. This activity is based on the survey of CO₂ extinguishing producers conducted in 2003.
35. The implementation status of the special initiative projects are summarized in Annex VI.

2006 Annual Program

36. ***Phaseout targets and objectives.*** The phaseout target is (see Annex I) to reduce halon 1211 production and consumption to 0 MT; to maintain halon 1301 production and consumption to a maximum of 100 MT as per the revised APP phase-out schedule. Production quotas have been issued consistent with these ceilings.
37. ***Implementation of policy instruments.*** The quota system continued to be the main tool for the implementing the halon phaseout and is supported fully by MPS. A catalogue of ban on production and sale for the phased out products including halon extinguishers and agents was issued by SETC. The deadline for halon and halon extinguisher production is in line with the sector plan timetable. Like previous years, a ban on sales and production of Halon for the commissioned project enterprises was issued.

Enterprise-level phaseout activities

38. ***Closure of halon production.*** Two complete closure contracts were signed with the remaining two halon 1211 producers and one quota reduction contract was signed with the halon 1301 producer. The national targets for halon production level in 2006 are in Annex II.
39. ***Closure & conversion of halon 1301 system manufacturers.*** China has conducted a survey on the halon 1301 consumption amount by all the remaining halon 1301 fire fighting system manufacturers. The survey shows that out of 22 halon 1301 system manufacturers in the halon sector plan with production license from MPS, there are only 12 left. A training workshop for halon 1301 fire fighting system manufacturers was held in September 2006. Contracts for 2006 AP will be signed by the end of October 2006.

Technical assistance activities

40. ***Training of Personnel Involved in Phaseout Activities*** 2005 halon performance Audit training was carried out in March 15-16, 2006. Enterprise training was held in September 2006.
41. ***Performance Audit for 2005 Annual Program*** As in previous years, CNAO conducts a performance audit for halon sector plan activities in 2005 to ensure the effective implementation of the annual program. The audit has been completed.
42. ***Investigation and Verification on feedstock application of halon 1301.*** A new TA project was added into the 2006 annual program. This project focused on two points. The first one is to verify that the related enterprises do have the facilities which use halon 1301 as feedstock. The second one is to investigate and verify through site inspection the use of halon 1301 as feedstock in terms of products, production capacity, halon 1301 used in 2005 and first six months of 2006. Based on the preliminary work carried out, it seems

- possible to establish a reasonable ratio between halon 1301 use as feedstock and the products produced.
43. To meet the need of halon phaseout in China, based on MPS proposal, following TA projects will be added in 2006 AP:
 44. ***Study on Testing technology and testing equipment for superfine dry powder extinguishing agent.*** Superfine dry powder extinguishing agent is a new and efficient solid extinguishing agent, which was developed in recent years. The agent can extinguish A, B and C class fires with more efficiency and has no impact on atmospheric Ozone. It is one of the ideal halon alternative agents. The standard GA578-2005 Superfine Dry Powder Extinguishing Agent has been issued in 2005. Since the establishment of testing technology and testing equipment plays an important role on implementing standards effectively, the project shall focus on studying testing technology and testing equipment for superfine dry powder extinguishing agent to implement the standard better and ensure the product quality. The project is to establish a testing technology and testing equipment.
 45. ***Requirements and approval procedure for installation of gaseous extinguishing system (fire product type approval standard for gaseous systems).*** This project supports a study on the market admittance standard for halon alternative gaseous extinguishing systems. The work includes relevant product standard, design code, approval procedures for newly installed systems, inspection procedures for installed systems as well as requirement for the enterprise quality control.
 46. ***Study on the condition evaluation method and the requirement of disposal technology for halon system*** In application field some halon 1211 and halon 1301 systems are in poor maintenance condition and with potential serious safety problems. According to relevant safety codes and product quality standard, the project is to study the condition of existing halon system (including alarm and control system combined), develop the condition evaluation standard and the requirement for mandatory disposal, and the disposal technology requirement for cylinder, middle or high pressure valves and halon agents.
 47. The implementation statuses of 2006 technical assistant projects are summarized in Annex VII.

Halon Recycling and Banking

48. During the implementation period from 1998 to 2005, China mainly focused on the phaseout activities of halon production/consumption and related activities. With the reduction of halon 1211 production to 0 and halon 1301 production to only 100mt by Jan. 1, 2006, starting from 2006, halon recycling and banking has become the most important issue of successful implementation of the Halon Sector Plan.
49. SEPA and MPS discussed formally the halon banking issue during the first half of 2006. Two decisions were made after discussion: one is to start-up operation of halon bank Guangdong branch as soon as possible, the other one is to update the overall plan for

China halon banking and management.

50. **Operation of Halon Bank Guangdong Branch.** The draft new TOR is finished and now is under review of SEPA and MPS. With the approval of SEPA and MPS, the TOR will be provided to the Bank for review. The main outputs of the activities are as follows:

- a) Establishing organization structure of the branch and start-up operation.
- b) Establishing the MIS system for halon recycling and refilling at branch level.
- c) Monitoring and supporting the set up of distillation section for contaminated recycled halon so that the recycled halon can meet the national standard..
- d) Issuing local necessary policies on halon recycling and refilling.
- e) Compiling management and operational plan for halon recycling and refilling.
- f) Establishing local certificate system, including certificate for recycled halon, collecting station, etc.
- g) Set up a couple of collecting stations basing on actual situation.
- h) Related training and propaganda through various media. Share experiences and lessons with other branches.

51. **Overall Plan for China Halon Banking.** The draft Plan is under reviewing of SEPA and MPS. A workshop is planned to discuss and evaluate the feasibility of the Plan. Participants for the workshop will include person from SEPA, MPS, China Certification Center for Fire Products, related fire institutes, consultants etc. The main contents of the Overall Plan including the following:

- a) Policies needed for halon recycling, refilling and reuse.
- b) Establishing certificate system, including certificate and labeling on recycled halon, certificate on qualification of recycling center and maintenance & refilling center.
- c) Establishing China halon banking, including central bank, branches, recycling centers and collecting stations.
- d) Establishing MIS system for halon recycling and reclaiming management at national level.

PART B

2007 ANNUAL PROGRAM

Objectives

1. The phaseout target for the 2007 annual program is (a) to remain halon 1211 production and consumption as 0 MT and (b) to remain halon 1301 production and consumption at a maximum of 100 MT. The 2007 program will also continue actions to ensure that the fire fighting capacity is not undermined as the result of an insufficient supply of substitutes of satisfactory quality.
2. China is requesting the release of the approved amount of US\$ 0.4 million for the 2007 annual program as agreed in the overall Halon Sector Phaseout Plan. To achieve these goals, the following activity is envisioned:
 - a. US\$0.4 million to be used for technical assistance activities in order to support the halon phaseout program and ensure that existing fire protection requirements can be met.
3. Additional activities might be added and funded through unallocated balance from 2006 annual program.

Policy instruments during the year

4. ***Policies to be continued.*** In 2007, the following policies and measures will continue to be implemented by the Government. These policies are considered necessary for the success of a total halon phaseout in China.
5. ***A new ODS regulation*** “ODS management regulation” has been under development since 2004. After several discussions and revisions through workshops with related departments, authorities of legal system and other stakeholders, the first draft of the National ODS Regulation was finalized in March 2006 and then was circulated among national ministries and local authorities for comments. This draft consists of six chapters covering the management and monitoring of ODS production, consumption, use, sale, import and export and the related legal liabilities. By July 2006, the first round of collecting comments and opinions has been completed. The draft has been revised in August 2006 and will be submitted to the meeting of the ministers of SEPA for review. Then, the draft will be submitted to the Regulation Department of the State Council for further review. At the same time, a hearing of witnesses will be conducted. After the review of the Regulation Department, the draft will be submitted to the meeting of the State Council for final approval. It is foreseen that this Regulation would be issued in 2007 and serve as a solid legal basis for sustainable ODS phase-out.
6. ***Other policy action taken are:***
 - a. Production quota license system -- The system will be continuously implemented in 2007 to ensure halon production below agreed annual ceiling amount.
 - b. The ban on new installations of halon extinguishers for non-essential uses and a

gradual tightening of the definition of essential uses will continue.

7. In order to support local enforcement of the ban on non-essential uses of halons in the most effective manner, the Government will ensure that:
 - a. SEPA/MPS will disseminate details of the ban to all prospective consumers through various channels (news media, bulletins, propaganda, etc.);
 - b. Local fire bureaus and environmental protection bureaus will jointly inspect consumers on a regular basis. If any consumer is found to use the newly-installed halon fire extinguishers in non-essential areas, the consumer will be required to change to non-halon systems within a defined time.
 - c. Joint inspection teams of the local fire bureaus and environmental protection bureaus will be required to submit regular reports to MPS and SEPA about the situation and measures in implementation of the ban.
 - d. Stricter control the sales of halon will be enforced by making use of the output of projects for four demonstration centers (that is Beijing, Shanghai, Guangdong province and Liaoning province) and replicating the experience to other provinces in order to reach phaseout goals.
8. As usual MPS will withdraw production licenses for manufacturing halon and halon-containing products from beneficiaries after their projects are completed.
9. China plans to issue policies needed for halon recycling, refilling and reuse.
10. China plans to establish certificate system, including certificate and labeling of recycled halon, certificate on qualification of recycling center and maintenance & refilling station.

Enterprise-level activities

11. ***Closure & conversion of halon 1301 system manufacturers.*** Any 1301 fire fighting system manufacturers which have not signed the conversion contracts in 2006 could apply for funds and sign phaseout contracts in 2007. The consumption phaseout activities will be on going and completed by the end of 2009.

Technical assistance (TA) activities

12. ***Study on the test method and equipment for water mist fire extinguishing system and its components*** Water mist fire extinguishing is one of halon replacement fire extinguishing systems, and its components quality is directly associated with the effect of fire extinguishing systems. In response to the implementation of *General technical specifications for components of water mist fire extinguishing system*, testing technique of components of water mist fire extinguishing system and testing equipment of are established, components of water mist fire extinguishing system for fire models on different fire scene to ensure the scientific and effective implementation of national standards.
13. ***Establishment of China engineering construction standard (national recommended***

standard): Technical regulations for HFC-23 Fire Extinguishing system HFC-23 fire extinguishing system is one of halon alternative fire extinguishing system, and is widely used in many places. The project will study and establish China Association for Engineering Construction Standardization *Technical Regulations for HFC-23 fire extinguishing system*, to decrease fire risks and protect life and property safety.

14. **Establishment of China Engineering Construction Standard (National Recommended Standard): Regulations for Design Construction and Acceptance of Dry powder fire Extinguishing Equipment** Dry powder extinguishing agent is one of accepted halon replacement agents, and is used in specific extinguishing systems or equipments. GA602-2006 *Dry powder fire extinguishing equipments* has been issued and implemented, in response to the implementation of the standard, this project will establish of CECS to standard and guide the use of dry-powder fire extinguishing equipments.

15. **The integrated control technology for automatic fire detection system and halon alternative system.** In actual engineering application the intergraded control between halon alternative systems and automatic fire detection systems does not work well in China. It is necessary to study the integrated control technology for various halon alternatives and automatic fire detection systems combined. The aim is to develop relevant engineering technical code for such product, provide technical references engineering design, construction and daily monitor and management.

16. **Training of Personnel Involved in Phaseout Activities** As in the previous year, it is considered necessary to train staff of local environmental protection bureaus, local fire fighting bureaus and halon enterprises in order to implement the phaseout plan effectively. Training will be also conducted to the enterprises to learn halon phaseout approach and take part in related phaseout activities. In addition, as the sector approach requires financial and performance audits, training has to be provided for audit agencies on the sector approach and the annual plan. Training workshops for the implementation of the ban on halon extinguisher uses in non-essential areas for local fire fighting bureaus are planned and will be held to maintain halon consumption phaseout achievements.

17. **Performance Audit for 2006 Annual Program.** As in previous years, CNAO will conduct a performance audit for sector plan activities in 2006 to ensure the effective implementation of the annual program.

18. Additional TA activities might be added during the year as needed.

Halon recycling and banking

19. In order to support the halon recycling and banking activities and prevent unnecessary emission of halon 1211, China plans to take the following actions:

- a) Start-up operation of halon bank Guangdong branch and start to establish the National Halon Bank in China to initiate halon recycle action nation wide. Some of the unallocated funds from 2006 annual program will be allocated to

the activities in accordance with the Bank's operational procedures.

- b) With the experiences from Guangdong branch operation, other new branches will be established based on the experiences and lessons learned.
- c) Halon 1211 fire extinguishers from non essential applications and more than 10 years old halon1211 fire extinguishers will be continue to be collected by recycling stations. In order to prevent leakage, halon 1211 from such obsolete fire extinguishers will be recovered and safely stored for essential uses as per Chinese criteria.
- d) One of the achievements from demonstration projects in 12 provinces and cities is that several thousand halon extinguishers have been collected. The halon banking will recover halon 1211 from the collected extinguishers.

Table BI. 2007 Annual Program

Halon phaseout targets & policy instruments				
	Start of program (MT)	End of program (MT)	Key Actions Required	Key Dates
Halon 1211				
Production ceiling	0	0	1.TA activities to support introduction of substitutes and alternatives to help phaseout	1. Jan-Dec. 2007
Export				
Consumption ceiling	0	0	1. Financial support for introduction of substitutes and alternatives 2. TA activities	1. Jan-Dec. 2007
Halon 1301				
Production ceiling	100	100	1. Production quota and TA activities to support introduction of substitutes.	1. Jan-Dec. 2007
Export	20	20		
Consumption ceiling	100	100	1. Conversion of halon 1301 system to non-halon system 2. Financial assistance to fire system manufacturers and TA activities to support introduction of alternatives.	1. Jan-Dec. 2007
Continuation of policy instruments				
Policy Instruments	Actions Required		Key Dates	
1. Production quota license system	1. Reduction production contracts will be signed. 2. Annual production quota issued to the one halon 1301 producer. 3. Production reporting by producer and monitored by SEPA.		1. By end of 2006 2. First quarter of 2007 3. Through 2007	
2. The ban on halon extinguisher uses in non-essential areas	1. Promotional campaign on the ban, through various channels. 2. Joint supervision of ban by local Fire Fighting Bureaus and Environmental Protection Bureaus.		1. Through 2007 2. Through 2007	

Enterprise-level Activities						
	Funding Requested (US\$ mill)	# of existing enterprises	# of enterprise targeted	# of enterprises at end of 2007	Key Actions Required	Key Dates
1. Reduction of halon 1301 production	0	1	0	1		
2. Closure/Conversion of halon 1301 system manufacturers	Funding from unallocated of 2006 AP	12	5-9	3-7		1. Contracts to be signed in 2006 2. Completed in 24 months

Table BII: 2007 Annual Program-Technical Assistance Activities

TECHNICAL ASSISTANCE ACTIVITIES			
Activities	MLF funding requested (US\$ million)	Actions Required	Key Dates
1. Study on the test method and equipment for water mist fire extinguishing system and its components	0.15	Selection of qualified institutions to carry out the project	1. Contract signed no later than 3Q 2007. 2. Finish work within 18 months after signing contract
2. Establishment of China engineering construction standard (national recommended standard): Technical regulations for HFC-23 Fire Extinguishing system	0.05	Selection of qualified institutions to carry out the project	1. Contract signed no later than 3Q 2007. 2. Finish work within 18 months after signing contract
3. Establishment of China Engineering Construction Standard (National Recommended Standard): Regulations for Design Construction and Acceptance of Dry powder fire Extinguishing Equipment	0.05	Selection of qualified institutions to carry out the project	1. Contract signed no later than 3Q 2007. 2. Finish work within 18 months after signing contract
4. The integrated control technology for automatic fire detection system and halon alternative system	0.05 (Funding from unallocated of 2006 AP)	Selection of qualified institutions to carry out the project	1. Contract signed no later than 3Q 2007. 2. Finish work within 24 months after signing contract
5. Training	0.08	Training workshops will be carried out	Training will be carried out through the 2007.
6. Performance Audit for 2006 Halon sector performance	0.07	Training of the performance auditors from CNAO and conduct the audits.	1. Contract signed by March 2007. 2. Complete by end of June 2007
TOTAL	\$0.4 million		

Table BIII: 2007 Annual Program - Proposed Performance Indicators

Halon Phaseout Targets				
Halon sector	Start of program (MT)	End of program (MT)	Performance Indicators	
Halon 1211	0	0	• Production levels (national aggregate halon 1211)	
Production ceiling				
Exports				
Consumption ceiling	0	0	• Consumption levels (national halon production plus import minus export)	
Halon 1301	100	100	• Production levels (national aggregate halon 1301 production)	
Production ceiling				
Exports	20	20		
Consumption ceiling	100	100	• Consumption levels (production plus imports minus exports)	
Continuation of Policy Instruments				
Initiatives	Performance Indicators			
Bidding system for TA projects				
The ban on halon extinguisher uses in non-essential areas	Training workshops conducted throughout the year in key provinces			
Enterprise-level activities				
Activities	Funding requested (US\$ mill)	Existing Enterprises	# of enterprises at end of 2007	Performance Indicators
Reduced Halon 1211 production	0	0	0	
Reduction of halon 1301 production	0	1	1	
Conversion of halon 1301 fire extinguishing system manufacturers	Funding from unallocated of 2006 AP)	12	5-9	

Table BIII: 2007 Annual Program - Proposed Performance Indicators (Contd.)

Technical assistance activities		
Activities	Amount in US\$ million	Performance Indicators
1. Study on the test method and equipment for water mist fire extinguishing system and its components	0.15	1. Contract signed no later than 3Q 2007. 2. Finish work within 18 months after signing contract
2. Establishment of China engineering construction standard (national recommended standard); Technical regulations for HFC-23 Fire Extinguishing system	0.05	1. Contract signed no later than 3Q 2007. 2. Finish work within 18 months after signing contract
3. Establishment of China Engineering Construction Standard (National Recommended Standard); Regulations for Design Construction and Acceptance of Dry powder fire Extinguishing Equipment	0.05	1. Contract signed no later than 3Q 2007. 2. Finish work within 18 months after signing contract
4. The integrated control technology for automatic fire detection system and halon alternative system	0.05 (Funding from unallocated of 2006 AP)	1. Contract signed no later than 3Q 2007. 2. Finish work within 24 months after signing contract
5. Training	0.08	Audit training and enterprise training in 2007
6. Audit for 2006 Halon Sector Performance	0.07	Complete by end of June 2007
TOTAL for Phaseout Activities	\$0.4million	

ANNEX I: Halon Phaseout Action Plan, January 1, 1998 to January 1, 2010

CHINA															
Halon Sector Phaseout Action Plan, January 1,1998 to January 1,2010															
		First Stage			Second Stage					Third Stage					Total Funding Request
Year	Base line production	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Halon 1211 (MT)															
Production target	9,950	7,960	5,970	3,980	3,317	2,654	1,990	1,990	1,990	0	0	0	0	0	
o.w. Export		800	600	400	200	0	100	100	0	0	0	0	0	0	
Import		0	0	0	0	0	0	0	0	0	0	0	0	0	
Domestic Consumption		7,160	5,370	3,580	3,117	2,654	1,890	1,890	1,890	0	0	0	0	0	
Production phaseout target		1,990	1,990	1,990	663	663	664	0	0	1,990	0	0	0	0	
Consumption phaseout target		1,790	1,790	1790	463	463	764	0	0	1,990	0	0	0	0	
Halon 1301 (MT)															
Production target ^{3/}	618	618	618	618	618	600	600	200	200	100	100	100	100	0	
o.w. Export		318	318	318	318	450	450	50	50	20	20	10	10	0	
Import		0	0	0	0	0	0	0	0	0	0	0	0	0	
Domestic Consumption		300	300	300	300	150	150	150	150	100	100	100	100	0	
Production phaseout target		0	0	0	0	150	0	400	0	100	0	0	0	100	
Consumption phaseout target		0	0	0	0	150	0	0	0	50	0	0	0	100	
Required funding from MLF (\$'000)		12400	9700	10600	4500	3700	5900	1200	1800	11400	400	300	100		62000

ANNEX II

Closures of halon production

A. 1998 Annual Program

Table 1: Closure of Halon 1211 Plants with 1998 Production Quotas

Name of plant	Halon phaseout (MT)	Closure date	Implementation status	Remarks
1.Zhedong No.1 Chemical Plant	347	January 1, 1998	Project completed. Equipment dismantled completely	Plant closure
2.Zhejiang Dongyang No.2 Chemical Plant	1,004	January 1, 1998	Project completed. Equipment dismantled completely	Plant closure
3.Zhejiang Xiaoshan Fire-fighting Chemical Plant	387	January 1, 1998	Project completed. Equipment for one production plant dismantled completely	Partial closure.
4.Foshan Electro-Chemical General Plant	300	January 1, 1998	Project completed.	Partial closure.
Total	2,038			

Table 2: Closure of Halon 1211 plants not assigned 1998 production quotas

Name of the plant	Halon phaseout (MT)	Year of stop production	Implementation status	Remarks
1. Dalian Fire-extinguishing Agent Plant	165.9	1997	Project completed and equipment dismantled completely	Dismantling and destruction of equipment verified
2. Zigong Fijian Chemical Plant	54.0	1997	Project completed and equipment dismantled completely	Dismantling and destruction of equipment verified
3. Guangdong Don guan Fire-fighting Equipment Plant	320.0	1997	Project completed and equipment dismantled completely	Dismantling and destruction of equipment verified
4. Guangxi Bihar Ocean Chemical Plant	40.0	1997	Project completed and equipment dismantled completely	Dismantling and destruction of equipment verified
5. Wenling Salt Farm Chemical Plant	70.5	1997	Project completed and equipment dismantled completely	Dismantling and destruction of equipment verified
Total	650.4			

B. 1999 Annual Program

Name of the plant	Halon phaseout (MT)	Closure date	Implementation status	Remarks
1. Zhejiang Xiaoshan Fire-fighting Chemical Plant	400	January 1, 1999	Project completed and equipment dismantled completely	Plant closure
2. Shandong Haihua Group Shouguang Fire-fighting Chemical Plant	500	January 1, 1999	Project completed Reactor pipes dismantled	Partial closure.
3. Wuxian Chemical Plant	388	January 1, 1999	Project completed Reactor pipes dismantled	Partial closure.
4. Zhejiang Dongyang Chemical Plant	654	January 1, 1999	Project completed Reactor pipes dismantled	Partial closure.
Total (Quotas sold back to Gvt.)	1,942			

C. 2000 Annual Program

Name of the plant	Halon phaseout (MT)	Closure date	Implementation status	Remarks
1. Zhejiang Dongyang Chemical Plant	779	January 1, 2000	Production based on reduced quota	Quota reduction
2. Shandong Haihua Group Shouguang Fire-fighting Chemical Plant	451	January 1, 2000	Production based on reduced quota	Quota reduction
3. Wuxian Chemical Plant	170	January 1, 2000	Production based on reduced quota	Quota reduction
4. Zhejiang fire-fighting Chemical Plant	130	January 1, 2000	Producing basing on reduced quota	Quota reduction
5. Foshan electro-chem. general plant	381	January 1, 2000	Production based on reduced quota	Quota reduction
6. Zhejiang chemical research institute	79	January 1, 2000	Production based on reduced quota	Quota reduction
Total (Quotas sold back to Gvt.)	1,990			

D. 2001 Annual Program

Name of the plant	Halon phaseout (MT)	Closure date	Implementation status	Remarks
1.Wuxian Chemical Plant	330	January 1, 2001	Project completed and equipment dismantled completely	Plant closure.
2. Zhejiang fire-fighting Chemical Plant	250	January 1, 2001	Project completed and equipment dismantled completely	Plant closure.
3.Zhejiang chemical research institute	150	January 1, 2001	Production quota for Halon 1211 cancelled and production line adjusted to disable ability to produce halon 1211.	Plant closure.
Total (Quotas sold back to Gvt.)	730			

E. 2002 Annual Program

Name of the plant	Halon phaseout (MT)	Closure date	Implementation status	Remarks
1. Foshan electro-chem general plant	780 (halon 1211)	January 1, 2002	Project completed and equipment dismantled completely	Plant closure.
2.Zhejiang chemical research institute	18 (halon 1301)	January 1, 2002	Production based on the reduced halon 1301 production quota.	Quota reduction

F. 2003 Annual Program

Name of the plant	Halon phaseout (MT)	Closure date	Implementation status	Remarks
1. Zhejiang Dongyang Chemical Plant	240	January 1, 2003	Production based on the reduced production quota.	Quota reduction
2.Shandong Haihua Group Shouguang Fire-fighting Chemical Plant	240	January 1, 2003	Production based on the reduced production quota.	Quota reduction
Total	480			

G. 2004 Annual Program

Name of the plant	Halon phaseout (MT)	Closure date	Implementation status	Remarks
1.Zhejiang chemical research institute	400 (halon 1301)	January 1, 2004	Production based on the reduced halon 1301 production quota.	Quota reduction

H. 2006 Annual Program

Name of the plant	Halon phaseout (MT)	Closure date	Implementation status	Remarks
1. Zhejiang Dongyang Chemical Plant	1320	January 1, 2006	Project completed and equipment dismantled completely	Plant closure.
2. Shandong Haihua Group Shouguang Fire-fighting Chemical Plant	670	January 1, 2006	Project completed and equipment dismantled completely	Plant closure.
Total	1990			
1. Zhejiang chemical research institute	100 (halon 1301)	January 1, 2006	Production based on the reduced halon 1301 production quota.	Quota reduction

ANNEX III

Phaseout Activities of Halon Extinguisher Manufacturers

A. 1998 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date#	Remarks
1.Zhejiang Xiangshan No.1 Fire-fighting Equipment Plant	1998.03.14	223.0	Project completed and commissioned.	1999.12.21	Closure
2.Zhejiang Yiwu Fire-fighting Extinguisher Plant	1998.03.14	162.2	Project completed and commissioned.	1999.06.24	Closure
3.Changzhou Fire-fighting Equipment Plant	1998.03.14	47.5	Project completed and Commissioned	1999.12.26	Conversion
4.Dalian Jinzhou Fire-fighting Equipment Plant	1998.03.14	105.7	Project completed and Commissioned	2000.01.05	Conversion
5.Guangxi Wuzhou Fire-fighting Equipment Plant	1998.03.14	52.4	Project completed and Commissioned	2000.01.06	Conversion
6.Guangzhou Zhujiang Fire-fighting Equipment Plant	1998.03.14	138.4	Project completed and Commissioned	2000.01.04	Conversion
7.Jiangxi No.1 Fire-fighting Equipment Plant	1998.03.14	220.8	Project completed and Commissioned	2000.01.07	Conversion
8.Nanjing Heli Fire-fighting Equipment Plant	1998.03.14	146.4	Project completed and Commissioned	1999.12.27	Conversion
9.Ningxia Yongning Fire-fighting Equipment Plant	1998.03.14	23.0	Project completed and Commissioned	2000.01.08	Conversion
10.Panyu Shengjie Fire-fighting Equipment Plant	1998.03.14	435.1	Project completed and Commissioned	2000.01.05	Conversion
11.Shanghai Haishen Fire-fighting Equipment Plant	1998.03.14	149.6	Project completed and Commissioned	1999.12.23	Conversion
12.Shanghai Punan Fire-fighting Equipment Plant	1998.03.14	268.4	Project completed and Commissioned	1999.12.24	Conversion
13.Shanghai Qingpu Fire-fighting Equipment Plant	1998.03.14	169.9	Project completed and Commissioned	1999.12.25	Conversion
14.Shenyang Fire-fighting Equipment Plant	1998.03.14	153.7	Project completed and Commissioned	2000.01.07	Conversion
15.Xiangshan Fire-fighting Equipment Plant	1998.03.14	270.6	Project completed and Commissioned	1999.12.23	Conversion
Total (Average halon 1211 consumption 1995 to 1997):		2,566.7			

#: **Completion date** means the date of commissioning the project by SEPA.

B. 1999 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date	Remarks
1.Zhejiang Dongyang Fire-fighting Equipment Plant	1999.03.16	131.88	Project complete and commissioned.	1999.12.24	Closure
2.Shanghai Global Fire-fighting Extinguisher Plant	1999.03.16	32.66	Project complete and commissioned.	1999.12.22	Closure
3.Helongjiang Fire-fighting Equipment Plant	1999.03.16	23.4	Project completed and commissioned.	2001.03.23	Conversion
4.Guangzhou Fire-fighting	1999.03.16	83.431	Project completed and	2001.04.18	Conversion

Equipment Plant			commissioned.		
5.Jiangsu Taixin Fire-fighting Equipment Plant	1999.03.16	336.6	Project completed and commissioned.	2001.03.01	Conversion
6.Chongqing Zhendan Fire-fighting Equipment Plant	1999.03.16	60.77	Project completed and commissioned.	2001.03.12	Conversion
7.Heilongjiang Shangzhi Fire-fighting Equipment Plant	1999.03.16	78.4	Project completed and commissioned.	2001.02.24	Conversion
8.Hubei jiangling Fire-fighting Equipment Plant	1999.03.16	194.78	Project completed and commissioned.	2001.02.26	Conversion
9.Shandong Weifang Fire-fighting Equipment Plant	1999.03.16	153.116	Project completed and commissioned.	2001.04.25	Conversion
10.Shunde Fire-fighting Equipment Plant	1999.03.16	192.72	Project completed and commissioned.	2001.04.19	Conversion
Total (Average halon 1211 consumption 1995 to1997):		1287.734			

C. 2000 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date	Remarks
1.Guangzhou Baiyun luoyang Fire-fighting Equipment Plant	2000.02.24	183.608	Project complete and commissioned.	2000.12.23	Closure
2.Zhejiang Linhai Fire-fighting Equipment Plant	2000.02.24	57.5	Project complete and commissioned.	2000.12.09	Closure
3.Anhui Bengbu Fire-fighting Equipment Plant	2000.02.24	142.124	Project complete and commissioned.	2000.12.06	Closure
4.Suzhou Fire-fighting Equipment Plant	2000.02.24	14.2677	Project completed and commissioned.	2001.07.30	Conversion
5.Shanghai No. 4 Fire-fighting Equipment Plant	2000.02.24	74.762	Project completed and commissioned	2001.07.29	Conversion
6.Lianyungang Tianyi Fire-fighting Equipment Plant	2000.02.24	52.35	Project complete and commissioned.	2001.08.01	Conversion
7.Tianjin Tanggu Fire-fighting Equipment Plant	2000.02.24	45.64	Project completed and commissioned.	2001.09.21	Conversion
8.Zhejiang Wananda Fire-fighting Equipment Plant	2000.02.24	56.5	Project complete and commissioned.	2001.07.28	Conversion
9.Zhenzhou Huanghe Fire-fighting Equipment Plant	2000.02.24	25.153	Project complete and commissioned.	2001.10.28	Conversion
10.Nanjing Honghu Fire-fighting Equipment Plant	2000.02.24	81.818	Project complete and commissioned.	2001.07.31	Conversion
11.Zhuhai Zhuzhou Fire-fighting Equipment Plant	2000.02.24	80	Project completed and commissioned.	2001.10.29	Conversion
12.Fujian Changle Fire-fighting Equipment Plant	2000.02.24	284.2	Project completed and commissioned.	2001.07.11	Conversion
Total (Average halon 1211 consumption 1995 to1997):		1097.923			

D. 2001 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Planned completion date	Remarks
1.Fuzhou fire-fighting equipment plant	2001.07.10	22.52	Project complete and commissioned.	2002.12.04	Closure
2.Zhenjiang fire-fighting equipment plant	2001.07.10	17.463	Project complete and commissioned.	2002.09.17	Conversion
3. Nanjing jiangpu fire-fighting equipment plant	2001.07.10	84	Project complete and commissioned.	2002.09.16	Conversion
4.Jiangsan fire-fighting equipment co.	2001.07.10	41	Project complete and commissioned.	2002.12.03	Conversion
5.Wuhan jiangnan fire-fighting equipment plant	2001.07.10	16.8	Project complete and commissioned.	2002.11.13	Conversion
Total (Average halon 1211 consumption 1995 to1997):		181.783			

E. 2002 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date	Remarks
1. Ningbo Yongjiang Fire Equipment Manufacturer	2002.10.28	4.2	Project complete and commissioned.	2003.10.28	Closure
2. Anhui Wuhu Wanjiang Fire Equipment Manufacturer	2002.10.28	1.17	Project complete and commissioned.	2003.10.28	Closure
3. Haerbin Longquan Fire Tools Manufacturer	2002.10.28	3.42	Project complete and commissioned.	2003.10.28	Conversion
4. Beijing Yanqing Changcheng Fire Equipment Manufacturer	2002.10.28	4.43	Project complete and commissioned.	2003.10.28	Conversion
5. Guangdong Shantou Fire Equipment Manufacturer	2002.10.28	9.12	Project complete and commissioned.	2003.10.28	Closure
6. Zigong Jianfei Fire Equipment Co. Ltd.	2002.10.28	9.177	Project complete and commissioned.	2003.10.28	Conversion
7. Bengang Fire Equipment Manufacturer	2002.10.28	17.77	Project complete and commissioned.	2003.10.28	Closure
8. Zhejiang Huzhou Meihua Group Co. Fire Equipment Manufacturer	2002.10.28	16.50	Project complete and commissioned.	2003.10.28	Closure
9. Daqin Fire Equipment Manufacturer	2002.10.28	17.63	Project complete and commissioned.	2004.04.28	Conversion
10. Ningbo Yinghai Fire Equipment Co. Ltd.	2002.10.28	104.39	Project complete and commissioned.	2004.04.28	Conversion
Total (Average halon 1211 consumption 1995 to1997):		187. 807			

F. 2003 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date	Remarks
1.Haerbin Fire Equipment Manufacturer	2003.11.04	6.07	Project complete and commissioned.	2005.06.08	Conversion

2. Jizhou City Wulu Fire Equipment Manufacturer	2003.11.04	5.43	Project complete and commissioned.	2005.06.08	Conversion
3. Leqing City Donghai Fire Equipment Manufacturer	2003.11.04	1.36	Project complete and commissioned.	2005.06.08	Closure
4. Kunming City Fire Equipment Manufacturer	2003.11.04	38.87	Project complete and commissioned.	2005.04.20	Conversion
5. Zhejiang Jindun Fire Equipment Co'; Ltd.	2003.11.04	48.674	Project complete and commissioned.	2005.03.30	Conversion
6. Hongzhou Fire Equipment Manufacturer	2003.11.04	313.2	Project complete and commissioned.	2005.03.29	Conversion
Total (Average halon 1211 consumption 1995 to1997):		413. 604			

G. 2004 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date	Remarks
1.Ningbo Fire Equipment Co., Ltd.	2004.11.11	108.52	Project complete and commissioned.	2005.12.8	Conversion
2. Shenyang No. 2 Fire Equipment Manufacturer	2004.11.11	0	Project complete and commissioned.	2006.2.15	Conversion
3. Zhejiang Qingyuan Fire Equipment Manufacturer	2004.11.11	10.24	Project complete and commissioned.	2006.2.15	Conversion
Total (Average halon 1211 consumption 1995 to1997):		118. 76			

ANNEX IV

Phaseout Activities of Halon System Manufacturers

A. 1998 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date	Remarks
1.Ningbo Sanyou Fire-fighting Equipment Ltd.	1998.03.14	50	Project completed and Commissioned	1999.12.24	Conversion

B. 1999 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date	Remarks
1.Guangzhou Fire-fighting Equipment Plant	1999.03.16	29.697	Project completed and commissioned.	2001.04.19	Conversion

C. 2000 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date	Remarks
1. Zhuhai Zhuzhou Fire-fighting Equipment Plant	2000.02.24	40.5	Project completed and commissioned.	2001.10.29	Conversion

D. 2001 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date	Remarks
1. Jiangxi ship's valve plant	2001.07.10	40	Project complete and commissioned.	2002.11.14	Conversion

E. 2003 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date	Remarks
1. Chendu Engine Company Chenghua Fire Equipment Plant	2003.10.30	15.913	Project complete and commissioned.	2005.04.08	Conversion
2.Tianjin Shengda Security Science Industry Company	2003.10.30	9.23	Project complete and commissioned.	2005.04.29	Conversion
3.Foshan City Yuan Fire Equipment Plant	2003.10.30	11.821	Terminated and license was withdrawn by MPS.		Conversion
4. Guangzhou City Yuanhua Electrical Appliance General Plant	2003.10.30	46.026	Project complete and commissioned.	2005.04.18	Conversion
5. Tianjin Fire Equipment General Plant	2003.10.30	16.06	Project complete and commissioned.	2005.04.28	Conversion
6. Tianjin Minan Fire Co., Ltd.	2003.10.30	18	Project complete and commissioned.	2005.04.28	Conversion
7. Nanjing Fire Equipment Co., Ltd.	2003.10.30	77.48	Project complete and	2005.03.28	Conversion

			commissioned.		
8. Xi'an Nucleus Equipment Co., Ltd. Weishi Fire Company	2003.10.30	27.503	Project complete and commissioned.	2005.04.10	Conversion
9. Baoji Fire Equipment General Plant	2003.10.30	1.12	Terminated and license was withdrawn by MPS.		Conversion
Total (Average halon 1211 consumption 1995 to1997):		223.153			

F. 2004 Annual Program

Name of the manufacturer	Project starting date	Phaseout amount (MT)	Implementation Status	Completion date	Remarks
1. Fujian Changle Minguang Fire Equipment Co., Ltd.	2004.11.11	73.21	Project complete and commissioned.	2005.12.9	Conversion

ANNEX V

Technical Assistance Activities

A. 1998 Annual Program

Name of TA Projects	Implementing Agencies	Contract Date	Implementation Status	Completion Date	Remarks
1. HAL-98-TA-1 Export/Import study	Beijing University	1998.09.28	Completed and commissioned	1999.11.30	Completed
2. HAL-98-TA-2 Revision of Standards for ABC Powder	Tianjin Fire Research Institute	1998.04.28	Completed and commissioned	2001.6.30	Completed
3. HAL-98-TA-3 Design Codes for Gaseous Fire Extinguishing Systems	Tianjin Fire Research Institute	1998.04.28	Completed and commissioned	2002.09.28	Completed
4. HAL-98-TA-4 Standards for Components of Gaseous Fire Extinguishing Systems	Tianjin Fire Research Institute	1998.04.28	Completed and commissioned	2001.6.30	Completed
5. HAL-98-TA-5 Halon Management Plan-Overall Management	Shanghai Fire Research Institute	1998.04.28	Completed and commissioned	1999.12.31	Completed
6. HAL-98-TA-6 Halon Management Plan-Training Courses and Propaganda Materials	Shanghai Fire Research Institute	1998.04.28	Completed and commissioned	2000.12.07	Completed
7. HAL-98-TA-7 Halon Management Plan-Provincial Promotions and Demonstration Centers	Shanghai Fire Fighting Bureau	1998.04.28	Completed and commissioned	1999.10.31	Completed
8. HAL-98-TA-8 Halon Management Plan-Provincial Promotions and Demonstration Centers	Guangdong Fire Fighting Bureau	1998.04.28	Completed and commissioned	1999.08.31	Completed
9. HAL-98-TA-9 Development of halon Management Database and Data collection System	Qinghua University	1998.04.28	Completed and commissioned	1998.09.28	Completed
10. HAL-98-TA-10 Management Information System	Qinghua University	1998.04.28	Completed and MIS accepted by SEPA	1998.04.02	Completed
11. Training	SEPA		Four training workshops have been conducted	1998.12.10	Completed

B. 1999 Annual Program

Name of TA Projects	Implementing Agencies	Contract Date	Implementation Status	Completion Date	Remarks
1. HAL-99-TA-1 Revision of national standard for CO ₂ fire extinguishing agent	Tianjin Fire Research Institute	1999.11.10	1) Test equipment has been installed; 2) Information on similar international standards collected & reviewed. 3) Project completed and commissioned	2002.06.01	Completed
2. HAL-99-TA-2 Study on test method and test equipment for CO ₂ fire extinguishing agent	Tianjin Fire Research Institute	1999.11.10	1) Test equipment has been installed; 2) Information on similar international standards collected & reviewed. 3) Project completed and commissioned	2002.06.01	Completed
3. HAL-99-TA-3 Revision of the design code of CO ₂ fire extinguishing systems	Tianjin Fire Research Institute	1999.11.10	1) Test equipment has been installed; 2) Information on similar international standards collected & reviewed. 3) Project completed and commissioned	2002.06.01	Completed
4. HAL-99-TA-4 Formulation of national standard for HFC227 agent	Tianjin Fire Research Institute	1999.11.10	Project completed and commissioned	2002.06.01	Completed
5. HAL-99-TA-5 Study on the standard and test method of CO ₂ extinguishers with light cylinders	Shanghai Fire Research Institute	1999.11.10	PCR submitted , Project completed and commissioned	2002.06.01	Completed
6. HAL-99-TA-6 Study on the scope of use of CO ₂ extinguishers	Shanghai Fire Research Institute	1999.11.10	PCR submitted , Project completed and commissioned	2002.06.01	Completed
7. HAL-99-TA-7 Study on the disposal standard for Halon 1211 extinguishers	Shanghai Fire Research Institute	1999.11.10	Project completed and commissioned	2002.06.01	Completed
8. HAL-99-TA-8 Halon management plan--establishment of demonstration centers	Beijing Fire Fighting Bureau	1999.11.10	1) The demonstration center has been established and are now in operation 1) A series of local policies have been formulated and issued. 2) Halon consumption survey has been carried out. 3) Propaganda has been launched on newspaper, magazines and TV 5) Project completed and commissioned.	2001.10.10	Completed
9. HAL-99-TA-9 Policy study of demonstrative halon bank	Guangdong Fire Fighting Bureau	1999.11.10	1) International Information on halon bank policies have been collected and reviewed; 2) The framework of Guangdong demonstrative halon bank has been formulated. 3) Recycle and reclaim procedure has been studying and testing. 4) Project completed and commissioned	2001.10.10	Completed
10. Training	SEPA		Four training workshops have been conducted activities completed	1999.11.12	Completed

C. 2000 Annual Program

Name of TA Projects	Implementing Agencies	Contract Date	Implementation Status	Completion Date	Remarks
1. HAL-00-TA-1 Design code for Water Mist Fire extinguishing System					Cancelled
2. HAL-00-TA-2 Performance test Method of Components for Water Mist Fire Extinguishing Systems					Cancelled (Postpone to 2004)
3. HAL-00-TA-3 Propaganda for Halon Sector Approach and Halon Alternative Technology	Shanghai Aozhen Technology Development Company	2000.10.15	The book was finished, published and handed out to relevant parties. Project completed and commissioned	2000.12.31	Completed.
4. HAL-00-TA-4 Design Code for Dry Powder Fire Extinguishing System					Cancelled (Postpone to 2004)
5. HAL-00-TA-5 Tests equipment for light weight CO2 Cylinders	Shanghai Fire Research Institute	Oct. 2001	Completed and commissioned	2003.12.31	Completed
6. HAL-00-TA-6 Future requirements for essential uses, Special places					Cancelled
7. HAL-00-TA-7 Standards for Mechanic foam extinguishers					Cancelled
8. HAL-00-TA-8 Standards for portable dry powder extinguishers					Cancelled
9. HAL-00-TA-9 Nitrogen system					Cancelled
10. Training	DIA		Four training workshops were carried out	Within 2000	Completed

D. 2001 Annual Program

Name of TA Projects	Implementing Agencies	Contract Date	Implementation Status	Completion Date	Remarks
1. HAL-01-TA-1 Formulating Design Code for Mist Water Fire Extinguishing System					Cancelled
2. HAL-01-TA-2 Revision of Design Code for Installation of Fire Extinguishers for Buildings					Cancelled
3. HAL-01-TA-3 Feasibility Study on Substitutes for Halon Fixed Fire Extinguishing Systems					Cancelled
4. HAL-01-TA-4 Studies of Market Prospect for Closure Enterprises	Seven enterprises were chosen to carry out the project	2001.4.10	Completed	December 2002	Completed
5. Training	DIA		Four training courses were carried out	2001.12.31	Completed

E. 2002 Annual Program

Name of TA Projects	Implementing Agencies	Contract Date	Implementation Status	Planned/Completion Date	Remarks
1. HAL-02-TA-1 Study on Evaluation Method of Engineering Application of Inert Gases Fire-fighting System	Tianjin Fire Research Institute	2003.9.30	1. Contract signed in Sep. 2003 2. the project implementing plan was revised in Nov. 2004 3. Completed testing system design, equipment purchased, installed and adjusted	2007-02-29	Ongoing
2. HAL-02-TA-2 Evaluation Method of Engineering Application of Heptfluoride Propane Fire-fighting System	Tianjin Fire Research Institute	2003.9.30	1. Contract signed in Sep. 2003 2. the project implementing plan was revised in Nov. 2004 3. established data collecting system, purchased equipment	2007-04-30	Ongoing
3. HAL-02-TA-3 National Standard Formulation for General Specifications of Low-pressure Carbon Dioxide Fire-fighting System and Parts	Tianjin Fire Research Institute	2002.12.31	Completed and commissioned	2005-4-28	Completed
4. HAL-02-TA-4 Study on the Testing Equipment and Technology of Aerosol Fire Extinguishing Agent	Tianjin Fire Research Institute	2002.12.31	Completed and commissioned	2004-12-31	Completed
5. HAL-02-TA-5 Standard Formulation for Aerosol Fire Extinguishing Agent	Tianjin Fire Research Institute	2002.12.31	Completed and commissioned	2004-10-31	Completed
6. HAL-02-TA-6 Study on Testing Equipment and Technology of Heptfluorid Propane Fire Extinguishing Agent	Tianjin Fire Research Institute	2002.12.31	Completed and commissioned	2004-10-31	Completed
7. HAL-02-TA-7 National Standards Formulation for Inert Gas Fire Extinguishing Agent	Tianjin Fire Research Institute	2002.12.31	Completed and commissioned	2005-4-28	Completed
8. HAL-02-TA-8 Study on the Testing Equipment and Technology of Inert Gas Fire Extinguishing Agent	Tianjin Fire Research Institute	2002.12.31	Completed and commissioned	2004-10-31	Completed
9. HAL-02-TA-9 Liaoning Halon Management Plan	Liaoning Fire Bureau	2002.11.06	Completed and commissioned	2005-5-20	Completed
10. HAL-02-TA-10 Performance Audit 2001	CNAO		Performance audit was conducted in April-June, 2002	2002.10.31	Completed
11. Training	DIA		three training courses were carried out	2002.12.31	Completed

F. 2003 Annual Program

Name of TA Projects	Implementing Agencies	Contract Date	Implementation Status	Planned/ Completion Date	Remarks
1. HAL-03-TA-1 Standard of "General Specifications of Aerosol Fire Extinguishing Equipment"	Tianjin Fire Research Institute	2003.12	1. collect information 2. established test method and conducted tests 3. the standard was finished and reviewed. 3. PCR is reviewed by PMO	2006.12	ongoing
2. HAL-03-TA-2 Testing Equipment and Technology for Aerosol Fire Extinguishing Equipment	Tianjin Fire Research Institute	2003.12	1. collect information 2. established testing equipment 3. carried out tests 4. PCR is reviewed by PMO	2006.12	ongoing
3. HAL-03-TA-3 Performance Audit 2002	CNAO	2003.03	Performance audit was conducted from March-June, 2003	2003.09	completed
4. Training	DIA		Two training courses have been carried out in the second half of 2003	2003.12.31	completed

G. 2004 Annual Program

Name of TA Projects	Implementing Agencies	Contract Date	Implementation Status	Planned/ Completion Date	Remarks
1. HAL-04-TA-1 Standard for Performance Requirements and Test Methods of Components for Water Mist Fire Extinguishing Systems	Tianjin Fire Research Institute	2005-3-31	1. The contract was signed on March 31, 2005 2. collected information drafted the standard 3. to be reviewed by sub-committee of fire standard	2007.04	ongoing
2.. HAL-04-TA-2 Design Code for Dry Powder Fire Extinguishing Systems	Tianjin Fire Research Institute	2005-3-31	1. The contract was signed on March 31, 2005 2. the project is completed and ready for commission.	2006.12	ongoing
3. HAL-04-TA-3 Performance Audit 2003	CNAO	2004.03	Performance audit was conducted from March-June, 2004	2004.09	completed
4. Training	DIA		Two training workshops will be carried out in the second half of 2004, one in the early of 2005		completed

H. 2005 Annual Program

Name of TA Projects	Implementing Agencies	Contract Date	Implementation Status	Planned/ Completion Date	Remarks
1 .HAL-05-TA-1 Verification of the actual production of CO ₂ extinguisher of 2005	Shanghai Fire Institute	2005.12.31	The survey was completed and the PCR is under review by PMO.	2006.12	ongoing
2.. HAL-05-TA-2 Research on assessing halons' essential usages	Select qualified consultant by bidding		the project is under bidding.	24 months after contract signed	Contract to be signed by the end of 2006.
3. HAL-05-TA-3 Establishment the management and Monitoring mechanism of Guangdong halon recycling center					Cancelled and changed to operation of Guangdong halon bank.
4. HAL-05-TA-4 Survey on producers of halon 1301 system					Completed.
5. HAL-05-TA-5 Performance Audit 2004	CNAO	2005.03	Performance audit was conducted from March-June, 2004	2005-7-20	completed
6.Training	CNAO		Audit performance training was carried out in April 4-6, 2005.	2005.04	completed

I. 2006 Annual Program

Name of TA Projects	Implementin g Agencies	Contract Date	Implementation Status	Planned Completion Date	Remarks
1. Study on Testing technology and testing equipment for superfine dry powder extinguishing agent	Selected by bidding.		TOR is under preparation.		
2. The market admittance standard for gaseous extinguishing system (fire product type approval standard for gaseous systems)	Selected by bidding.		TOR is under preparation.		
3. Study on the condition evaluation method and the requirement of disposal technology for halon system	Selected by bidding.		TOR is under preparation.		
4. Investigation and Verification on feedstock application of halon 1301	Prof. Hu Jianxin was selected as consultant.	2006.07	The contract for consultants' sevice was signed on July 26, 2006.	2006.12	Ongoing
5. HAL-06-TA-1 Performance Audit 2005	CNAO	2006.03	Performance audit was carried out from March to June, 2006	2006.07	completed
6. HAL-06-TA-2 Training	CNAO CNCCC		1.Audit training was carried out in March 15-16, 2006; 2. Enterprises training was held in September 2006	1. 2006.03 2. 2006.09	completed.

ANNEX VI

Special Initiatives

Special initiative	Name of the manufacturer	Project starting date	Implementation Status	Completion date	Remarks
1. HAL-99-SI-01 ABC Dry Powder Production Line	Foshan Electro-Chem. General Plant	1999.05.12	Project completed and commissioned.	2001. 10.12	Completed
2. HAL-00-SI-02 National Halon Phaseout Conference	SEPA	2000.08.01	The conference was held on Nov. 22, 2000. Activity completed	2000.12.31.	Completed
3. HAL-00-SI-03 Halon Bank (Establishment of Guangdong Halon Recycling Center)	Panyu Shengjie Fire Fighting Equipment Plant	2000.08.05	Project completed and commissioned.	2004.07.21	Completed
4. HAL-00-SI-04 Light Weight CO ₂ Cylinders Production Line	Weifang Dongming Fire-fighting Equipment Co., Ltd.	2000.11.18	Project completed and commissioned.	2004.09.11	Completed
5. HAL-01-SI-01 Plant Protein Foam test laboratory Project	Honsen Fire-fighting Hi-tech Co., Ltd.	2000.08.31	Project Completed and commissioned.	2002.10.29	Completed
6. HAL-02-SI-02 Development of a 3,600 MT/Y Production Line of Honsen L119 Vegetable -protein Foam Extinguishing Agent	Dalian Honsen Hi-tech Fire-fighting Co., Ltd.	2003.10.09	All the procurement equipment has been installed and it is expected to start trial operation in Sept. 2006 in Dalian.	2006.12	Ongoing
7. HAL-03-SI-01 Survey for CO ₂ Extinguisher Production	Shanghai Fire Research Institute	2003.06	Project completed and commissioned	2003.09.30	Completed
8. HAL-04-SI-01 Establishment of hexafluorapane agent standard and testing technology	Tianjin Fire Research Institute	2005.08	1.The contract was signed on Aug. 30, 2005 2. The draft standard has been circulated for comments.	2007	Ongoing
9. HAL-04-SI-02 Development of Hexafluoropropane Fire Extinguishers.	Shanghai Fire Research Institute	2005.08	1.The contract was signed on Aug. 30, 2005	2007	Ongoing
10. HAL-05-SI-03 Expand the production of CO ₂ extinguisher	3 producers were selected	2005.06.16	Three contracts were signed with 3 CO ₂ extinguisher producers in June 16, 2005.	2006.11.16	Ongoing
11. HAL-06-SI-2 Operation of Halon Bank Guangdong Branch			TOR under preparation		