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EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
Forty-seventh Meeting  
Montreal, 21-25 November 2005

**PROJECT PROPOSAL: MEXICO**

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

Production

- Sector plan for phasing out CFC-11 and CFC-12 production sector (fourth tranche)

UNIDO

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## PROJECT DESCRIPTION

1. The Government of Mexico, through UNIDO, has requested funding of US \$11.85 million and support costs for the 2006 annual implementation programme of the sector plan for phasing out CFC-11 and CFC-12 production sector.

### Background

2. The Executive Committee at its 40<sup>th</sup> Meeting in 2003 approved in principle a total of US \$31.85 million for the implementation of the Agreement for the Mexican CFC production sector, and disbursed the first tranche of US \$5.3 million to the project. Under the Agreement, the Government of Mexico is committed to a dual condition of a maximum level of total CFC production of 22,000 metric tonnes for the period 2003-2005, and at the same time not exceeding the maximum allowable production limit specified in the Agreement for each of the three years. Subsequently, the Executive Committee released the 2004 and 2005 tranches of funding of US \$10.7 million at its 42<sup>nd</sup> Meeting and US \$4.0 million at its 45<sup>th</sup> Meeting after a satisfactory verification of the 2003 and 2004 CFC production levels, which confirmed that the country had produced a total of 8,694 and 8,044 metric tonnes of CFC-11 and CFC-12 in 2003 and 2004 respectively and therefore met the two conditions specified in the Agreement.

3. In response to a request from UNIDO, the Executive Committee decided, at the 45<sup>th</sup> Meeting, to “consider releasing the final funding tranche of the Mexican CFC production phase-out project at the 47<sup>th</sup> Meeting upon satisfactory verification of CFC production in Mexico in 2005, provided that cash flow of the Multilateral Fund at the time so permitted.” UNIDO reported that Quimobasicos, the sole CFC producing plant closed its CFC production in August 2005 and therefore is submitting to the 47<sup>th</sup> Meeting the 2006 annual work programme, which contains a proposal for continuous monitoring of the CFC production plant till 2009 after its cessation of CFC production, and a request for the release of the 2006 tranche of US \$11.85 million and the associated support cost of US\$888,750 for UNIDO.

4. In accordance with the conditions of the Agreement that the release of the funding tranches subsequent to 2003 requires the submission by UNIDO of the independent verification of the production in the preceding year to be within the Montreal Protocol requirement, and within the total allowable production limits of the Agreement, together with a work programme for the relevant year, UNIDO is submitting the verification of the 2005 CFC production in Mexico. The 2006 annual work programme and the verification report on the 2005 CFC production are attached. The relevant data on the Agreement and the 2006 annual work programme are as follows:

Country	Mexico
Project title:	Sector Plan for Phasing out CFC-11 and CFC-12 Production Sector
Year of plan	2006
# of years completed	3
# of years remaining under the plan	0
Maximum Allowable CFC Production between 2003-05 in Agreement	22,000 mt
Maximum Allowable Annual CFC Production in 2003 and 2004	12,355 mt
Actual CFC production in 2003	8,694 mt
Actual CFC production in 2004	8,044 mt
Maximum Allowable 2005 production in Agreement	5,262 mt
Total funding approved in principle for the CFC phase-out plan	US \$31.85 million
Total funding released as of March 2005	US \$20 million
Level of funding requested for 2006 Annual Plan	US \$11.85 million

### Verification of the 2005 CFC production in Mexico

5. The verification was carried out in September 2005 by Ess Jay Consultants, the same consulting firm which had performed the 2003 and 2004 verifications. The report included an executive summary, the report itself and the data presented in the format prescribed in the guidelines for verifying ODS production phase-out approved by the Executive Committee in 2000. The report first described briefly the history of the CFC plant, Quimobasicos, which had two production units with capability to produce CFCs and HCFC-22. However, due to the insufficient demand for CFCs and the relatively long and uneconomical mode of switching between the two product series, only one plant continued producing CFCs after 1995 while the other is dedicated to HCFC-22 production. The verification team covered only the unit which was dedicated to CFC production, and visited the HCFC plant to confirm that it produced only HCFCs.

6. The plant operated between January and August in 2005 and closed its production on 25 August. Due to the reduced demand for CFC-11 on the market, the plant made a decision to modify the process reactor in order to recycle CFC-11 to CFC-12 and as a result converted 382.8 metric tonnes of CFC-11 to 326.43 metric tonnes of CFC-12.

7. The verification team was reported to have access to all the plant premises and the documents needed for the exercise, including raw material purchase and issue records; daily production logs; stock transfer and records for storage; sales invoices; monthly VAT returns filed with the revenue authority; and import quotas and actual imports of CTC and HF. The auditors randomly selected days from 4 months of the year as samples for checking. The team started by auditing the opening stock of CFC-11 and CFC-12, and the volumes of CTC and HF for feedstock from the financial records and the records of the warehouse for the year 2005. Then the report described the verification of the procurement of raw materials by checking the list of purchases from the finance department and cross-checking with a select number of invoices, since all the CTC and HF were imported under the control of the Government quota system. There was a description of the process of daily production and movement of the finished product within the plant, the recording of actual production, net production and the filling losses. The raw material consumption ratio was also checked against the historic record and industry norms and was reported as acceptable.

8. This was followed by the examination of the packaging of CFC products and a description of the process in the plant. There was a sample check of the accounting records of the packages, a check on the weight of the different packages, and of the gas quality through gas chromatography. The verification finally examined the sales invoices against the sales register and VAT returns, and the closing stock of CFC products and the feedstock. The report also included 8 annexes with copies of the original records that had been examined.

9. The results of the verification were that Quimobasicos produced 5,201 metric tonnes of CFCs in 2005 which was broken down into 278 metric tonnes of CFC-11 and 4,923 metric tonnes of CFC-12. This was below the 5,262 metric tonnes for 2005, the remaining level of production from the 22,000 metric tonnes for the period 2003-05, the target set in the Agreement after deducting the 8,694 metric tonnes produced in 2003 and the 8,044 metric tonnes produced in 2004. The plant recorded 4 metric tonnes as filling losses which was accounted for in the total allowable production.

10. The data collected by the verification team were presented using the format in the guidelines for verifying ODS production phase-out which included month-by-month production of CFCs and HCFC-22, number of days in production, consumption ratios of feedstock to CFC and HCFC-22 production, inventory change in CTC and HF for feedstock as a way of validating the CFC production.

#### Cessation of CFC production

11. The auditors examined the process of terminating CFC production at Quimobasicos and confirmed the remaining inventory of CFC products and feedstock as of August 2005:

CTC:	48.4 mt
HF:	231.3 mt
CFC-11:	355.7 mt
CFC-12:	3,783.6 mt

12. The auditors received the following information on the commitment of a permanent closure of the CFC production capacity, namely, written confirmation by the Director General of Quimobasicos to cease production, and the letter of the Government of Mexico to revoke the import license of Quimobasicos for CTC. There was a note from the auditors on the changes already made to the equipment and those which would be made to change the plant to the production of HCFC-22.

13. The auditors recommended further annual audits to ensure the sustainability of the closure and suggested the following as parameters for future audits:

- No entry of CTC into the plant after the closure date of CFC production;
- Verification of stock, purchase and use of HF for HCFC-22;
- Production verification of both Quimobasicos plants;
- Stock verification of the inventory of CFC-11 and CFC-12 and reductions of the inventory over the years;
- Verification of consumption norms of chloroform and HF for HCFC-22 production;
- Changes carried out in the plant, equipment additions and modifications;
- Any other checks needed for full compliance.

### The 2006 work programme

14. The 2006 work programme includes three parts, namely, a project summary, work programme achievements in 2004 and 2005 and the objectives and activities of the 2006 work programme and beyond. The project summary includes the target and funding level for the 2006 work programme. According to the Agreement, there should be no more CFC production in 2006 and beyond. The focus of the work programme is to sustain the closure of CFC production.

15. The report on the achievements of the 2004 and 2005 work programmes includes the policy measures, technical assistance activities, and the monitoring carried out for the implementation of the production phase out programme. It is particularly worth mentioning the effort under way in 2005 to introduce the ban on the production and imports of CFCs.

16. The programme will continue monitoring the production at Quimobasicos to ensure permanent closure through an annual financial and technical audit to be carried out by the Government and UNIDO in the first quarter of each year between 2006-09. The results will be submitted in the form of audit reports to the Fund Secretariat for review and the Executive Committee for information. The audits will be carried out following the recommendations by the auditors as contained in paragraph 12 above.

17. US \$11.6033 million out of the US \$11.85 million for the 2006 tranche would be allocated to compensate the CFC producer for closing down its production and the balance of US \$246,700 plus US \$124,436 carry-over from previous annual programmes would finance the technical assistance programme between 2006-09. The planned activities of the technical assistance are in Table 9 of the 2006 work programme.

## **SECRETARIAT'S COMMENTS AND RECOMMENDATIONS**

### **COMMENTS**

18. The verification of the 2005 CFC production at Quimobasicos establishes the production at 5,201 metric tonnes, which is below the maximum allowable production at 5,262 metric tonnes set in the Agreement. In total, the CFC production between 2003-05 is 21,939 metric tonnes (8,694 metric tonnes in 2003, 8,044 metric tonnes in 2004 and 5,201 metric tonnes in 2005), which is 61 metric tonnes below the target of 22,000 metric tonnes as set in the Agreement. Therefore Mexico has met the targets of the Agreement.

19. The plant terminated its CFC production in August 2005 as shown by the auditors and has taken measures to shift to the production of HCFC-22, which is permitted under the Agreement. The plant has taken engineering steps to ensure the permanent closure of its CFC production capacity and the process will continue. The Government of Mexico has also taken measures to ensure the sustainability of the closure, such as the revocation of the import permit for CTC, a key feedstock for CFC production.

20. The 2006 annual programme has proposed continued monitoring of the CFC plant by UNIDO and the Government of Mexico between 2006-09 on a number of parameters recommended by the auditors to ensure the permanence of the CFC production closure. This is a highly commendable course of action proposed by the Government and UNIDO, which should

be followed in similar production plant closures financed by the Multilateral Fund. The 2006 programme reports again on the further policy measures planned, which includes the gradual ban on CFCs in all sectors, the ban on CFC-containing equipment and the ban on CFC imports. The initiatives would facilitate the CFC production closure project as well as the CFC national phase-out programme, which is also under implementation. However it does not provide any date for its completion and enactment.

21. The verification of the 2005 CFC production at Quimobasicos is carried out in accordance with the guidelines of the Executive Committee on verifying ODS production phase-out, and contains a reasonable description of the methodology and documentation examined to confirm the achievement of the annual production reduction targets. It also provides recommended steps for further monitoring the disposal of the remaining inventory of CFC products and feedstock.

22. In accordance with the practice of presenting the verification reports of CFC production phase-out, the Secretariat includes only the aggregate data and not the annexes or the monthly data on production and feedstock consumption. However the annexes and the monthly data could be made available to any member of the Executive Committee upon request.

## **RECOMMENDATIONS**

23. The Secretariat recommends that, in light of the satisfactory verification indicating that the Mexico CFC production closure programme had achieved the CFC production reduction target in 2005 and the total CFC production target for 2003-05 as set out in the Agreement, and that Quimobasicos has ceased CFC production and started to dismantle its CFC production capacity, the Executive Committee may wish to:

- (a) Commend the Government of Mexico and UNIDO for the successful implementation of the CFC production closure Agreement and the permanent closure of the CFC production capacity at Quimobasicos;
- (b) Request the Government of Mexico and UNIDO to continue monitoring the CFC production closure at Quimobasicos between 2006-09, as proposed in the 2006 annual work programme; and
- (c) Approve the 2006 work programme of the Mexican CFC production phase-out Agreement at US \$11.85 million and US \$888,750 as support cost for UNIDO; however since this is an advance payment scheduled for the 2006 annual business plan, the level of disbursement at this meeting will be dependent upon the cash flow of the Fund after the commitments due in 2005 have been met, as per the terms of decision 45/62.

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## ANNUAL IMPLEMENTATION PROGRAMME

### Sector Plan for Phasing out CFC-11 and CFC-12 Production Sector, Mexico MEX/PRO/40/INV/115

## 1. PROJECT SUMMARY

### 1.1 Project data

<b>Country:</b>	Mexico
<b>Year of plan:</b>	2006
<b># of years completed:</b>	3
<b># of years remaining under the plan:</b>	0
<b>Substances:</b>	Annex A Group I and Annex B Group I
<b>Target ODS production of the preceding year (maximum):</b>	5,262 metric tonnes
<b>Target ODS production of the year of plan (maximum):</b>	0 metric tonnes
<b>Target ODS aggregate production for the years 2005 and 2006 (maximum):</b>	5,262 metric tonnes
<b>Level of funding requested:</b>	US\$ 11,850,000
<b>National coordinating agency:</b>	SEMARNAT <sup>1</sup>
<b>International implementing agency:</b>	UNIDO

### 1.2 Project target

<b>Target:</b>	0 METRIC TONNES
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Indicators	Actual in preceding year (2005)	Year of Plan (2006-2009)	Total in years in 2005 and onwards	Total in years 2003 to 2005
<b>Production, metric tonnes</b>	5,201	0	5,201	22,000

The CFC production in 2005 according to the findings of the technical and financial audit was **5,201** metric tonnes. As per the Agreement (see Section 2), the aggregate CFC production in years 2003 to 2005 shall not exceed 22,000 metric tonnes. In the years 2003-2004 the aggregate

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<sup>1</sup> Secretaria de Medio Ambiente y Recursos Naturales

CFC-11 and CFC-12 production of Mexico amounted to 16,738 MT. The remainder of the 22,000 MT allocation amounts to 5,262 MT.

Further in accordance with the Montreal Protocol obligations of Mexico, the CFC production in 2005 shall not exceed 50 % of the baseline production of 12,355 metric tonnes, i.e. 6,739 metric tonnes. Accordingly, the 2005 CFC production in Mexico was limited to maximum **5,262** metric tonnes and no production is allowed in 2006 and after.

## 2. BACKGROUND

The Agreement for the Sector Plan for Phasing out CFC-11 and CFC-12 Production Sector, Mexico (first tranche) was approved at the 40<sup>th</sup> Meeting of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol in July 2003<sup>2</sup>.

By approval of the Agreement, Mexico agrees that in exchange for the funding level specified in Table below, it will reduce its total production of the substances of Group I Annex A and Group I Annex B in an accelerated manner as compared to the allowable production indicated in the same Table 1.

**Table 1. Agreement for the Sector Plan for Phasing out CFC-11 and CFC-12 Production Sector**

Year	2003	2004	2005	2006	2007	2008	2009	2010	Total
Maximum allowable production (metric tonnes)	12,355	12,355	6,739	6,739	2,808	2,808	2,808	0	
Maximum production levels agreed (metric tonnes)	22,000*			0	0	0	0	0	22,000
Verified actual CFC production (metric tonnes)	8,694	8,044	5,201	-	-	-	-	-	21,939
MLF funding US\$ million	5.3	10.7	4.0	11.85	0	0	0	0	31.85
Agency fees US\$	397,500	802,500	300,000	888,750	0	0	0	0	2,388,750

\* Total maximum production for the years 2003 to 2005. It is understood that Mexico may not exceed its allowable production limit during any one year.

Through the implementation of the 2005 Annual Program of the Sector Plan for Phasing out CFC-11 and CFC-12 in the Production Sector (third tranche), Mexico has met its year 2005 Annual Implementation Programme target of containing the maximum CFC production level

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<sup>2</sup> Decision 40/54 (h), UNEP/OzI/Pro/ExCom/40/50 Annex V



below **5,262** metric tonnes, since the actual production of CFC-11 and CFC-12 was kept at the level of 5,201 metric tonnes.

In accordance with the Agreement, UNIDO, as the implementing agency, is submitting an Annual Program for the period "1 January 2006 - 31 December 2009" for the consideration at the 47<sup>th</sup> Meeting of the Executive Committee. This Annual Program has been prepared in cooperation with SEMARNAT.

This document describes the achievements of the 2005 Annual Program by Mexico and details the planned program and activities for 2006 - 2009. It is being submitted for approval and release of the fourth (last) tranche of funds amounting to US\$ 11.85 million including the enterprise compensation and the technical assistance (TA) component for the implementation of the 2006-2009 Annual Programme.

### **3. 2004 ANNUAL PROGRAM ACHIEVEMENTS**

#### **3.1 CFC Production phase-out and disbursement**

CFC production in 2005 amounted to 5,201 metric tonnes, against the target production of 5,262 metric tonnes set in the 2005 Annual Implementation Programme.

The disbursement to a CFC producer, Quimobasicos, in 2005 amounted to US\$ 4,000,000 , allocated for enterprise compensation.

The disbursement to the Government of Mexico and the financial obligation on the project during 1 January 2003-31 August 2005 used for the implementation of the TA component was of US\$ 478,864. This grant is has been allocated for the TA activities to be organized by the Government with the assistance of UNIDO:

<b>Activity</b>	<b>Cost, US\$</b>
Project management, local experts	94,140
Design of an information collection system of ODSs	10,415
Equipment acquisition	4,481
Creation of the system to collect data and information of ODSs	217,215
Training, local and international travels	39,991
Awareness programme	49,394
Technical and financial audit of Quimobásicos	63,228
<b>Total</b>	<b>478,864</b>

**Table 2. CFC Production phase-out and disbursement in 2003-2004**

Year	Production Phase-out		Grant Tranche (US\$)	
	Target (metric tonnes)	Achieved (metric tonnes)	Allocation (US\$ million)	Status of Obligations
2003	12,355	8,694 *	5,300,000	5,300,000
2004	10,400	8,044 *	10,700,000	10,699,873
2005	5,262	5,201 *	4,000,000	3,859,394

\* The independent audit team administrated by UNIDO verified CFC production in 2003 and in 2004.

### 3.2. Policy measures

#### Overview of the past activity

Mexico holds one of the most advanced CFC phase-out programs among Article 5 Countries. Actions started as early as in 1988 and have become a permanent effort of the Government of Mexico. These actions have been coordinated through the Ministry of Environment (currently SEMARNAT). The Mexican CFC policy framework has been focusing on the use and supply of CFCs rather than on actions to control production. Some of the most important measures implemented, include:

- a) **Monitoring on trade of CFCs:** Starting from 1993, the Ministry of Environment has required the national CFC producing enterprises to voluntarily report domestic and international commercial activities such as production, imports and exports volumes. The industry is fully compliant with this requirement.
- b) **Import control on CFCs and CTC:** SEMARNAT has set up an import licensing system on CFCs and CTC, using an inter-ministerial mechanism called CICOPRAFEST. The Ministry of Finance through the Customs Office enforces this regulation. Under the system, only the holder of import rights (namely Quimobásicos) is allowed to import the raw material (carbon tetrachloride) for the production of CFCs, and only the holders of import rights of CFC (namely Quimobásicos and Dupont) are allowed to import these substances. Allocation of rights is based on historical (1990) domestic sales data. Quotas are established according to the average sales of the years 1995-1997 and subjected to the internal goals of SEMARNAT.
- c) **Constraints for growth on industrial demand of CFCs:** Since 1993, SEMARNAT has played an active role to circumvent the installation of any new CFC consuming facility in the Country, with emphasis on the original equipment manufacturer (OEM) sector. For the installation of any new production facility in the Country Mexican law requires an operation's license, which is granted by SEMARNAT, in order to manage related environmental impact and risks, and to establish emission prevention and control requirements, as well as to define operational conditions and growth. To enable compliance with the Mexican obligations under Montreal Protocol, SEMARNAT has been able to

discourage the use of CFCs, and negotiate in favour of CFC substitutes, thus avoiding new progress on CFC consumption in the OEM sector.

Notwithstanding the current degree of success of controlling and diminishing CFC consumption in the Country, the major concerns of the Government regarding further progress of the phase-out process enabling definite compliance with Montreal Protocol obligations are:

- a) Prohibition of import of CFC containing equipment: Since 1998 the Government has been setting up temporary prohibitions on import of refrigeration, air conditioning and water cooling equipment using CFCs in order to halt new additional CFC demand, and complement efforts in controlling manufacturing industry's demand. Permanent control measures will be established by SEMARNAT to prohibit import of equipment using CFC, including also used cars in addition to refrigeration equipment.
- b) Controlling availability of CFCs on the Mexican market: Although collaboration with CFC producers/importers have provided major advancements on control of CFC availability, an agreement on a definite CFC production and import phase-out schedule will be formalized as an integral part of the present project. Nevertheless, the Government of Mexico is concerned about the uncontrolled introduction of CFCs to the Country, and to that end, is preparing actions to strengthen regulations and enforcement to control illegal trade. Support from the international community is being received as part of this project to enhance and speed-up the implementation of such regulations and enforcement.

#### Planned activities

The Government of Mexico established additional supporting measures to promote CFC production phase-out in the Country, while considering domestic remnant necessities and consumption phase-out concerns as discussed in the previous chapter. The main objective of the formulation of the regulatory instruments is the strengthening of a policy framework to achieve complete ODS phase-out complying with the obligations under the Montreal Protocol in a gradual and orderly manner to minimize adverse economic affects to all sectors involved.

a) Ozone Depleting Substances (ODS) Regulations: The Mexican Government has initiated formulation of a detailed regulation to monitor and control the production and uses of Ozone Depleting Substances in the Country. Proposed regulations include control mechanisms for several Ozone depleting substances, such as CFCs, carbon tetrachloride, halons, methyl chloroform, and methyl bromide. Salient features of the proposed regulation regarding CFCs are:

- (i) Gradual abandonment of the use of substances that deplete the Ozone layer in all sectors consistent with the Montreal Protocol obligations. The official norm would be compulsory for all producers, importers, exporters, distributors, vendors and commercial and industrial consumers of CFCs.

- (ii) From the date of implementation of the official norm, authorized commercialization of CFCs will be only permitted to satisfy basic internal needs and essential uses in the Country. The regulation will include schedules with maximum allowable quantities permitted for such uses on a yearly basis until 2010.
- (iii) From the date of implementation of the regulation, it will be prohibited to produce or import all kinds of refrigeration equipment, air conditioning equipment, propellant formulations, plastic foam or solvent cleaning operations that use or contain CFCs, except those related to essential uses as defined by the Montreal Protocol.
- (iv) The regulation will establish rules to control the commercialisation of recycled or reprocessed CFCs.

### Achievement in 2005

A series of policy measures were adopted and implemented during the course of the year 2003 as summarized below.

a) Production Quota: The Government of México established a CFC production quota to the CFC producing enterprise, Quimobásicos. The production quota system is in place from January 2004.

The monitoring and enforcement mechanism for the production plan involve:

- (i) Quota system operation is established as a production cap issued to the Production Sector by SEMARNAT (production quota);
- (ii) Mandatory reporting of Production Sector on actual production figures to the National Ozone Unit;
- (iii) Monitoring and supervision of implementation of CFC production cap, and on import of raw material (carbon tetrachloride);
- (iv) Sanctioning of the production sector in case of exceeding its and/or import quota; in such cases the quota is correspondingly reduced for the following year taking into consideration also the production Sector phase-out Agreement with the ExCom (ANNEX IV).

b) Regulation for control of ban of production and import of CFCs: The Government of México is promoting an agreement between the CFC importers to close the importation, and only use in the next years the stockpiles produced during the period of 2003-2005.

**Table 3. Policy measures achievement in 2005**

<b>Legislation</b>	<b>Related Activity</b>	<b>Planned Timing in project proposal</b>	<b>Achievement in 2004</b>
Production Quota	Introduction of production quota	2003 - 2004	Production Quota was put in place. CFC Production has been controlled by import regulation of CTC. Since September 2005 the import of CTC as raw material has been banned, and the possible remnant stockpiles should be returned to the country of origin
Regulation for control and ban of production and import of CFCs	Enactment	By 2005	Draft regulation prepared

### 3.4 Technical assistance activities

#### Implementation modality

Following steps have been taken in order to execute the technical assistance activities.

- Project approval: July 2003
- Allocation of the grant for the compensation for the enterprise and the technical assistance activities determined: September 2003
- Detailed technical assistance activities determined: October 2003
- Budget allocation for each activities determined: October 2003
- Mechanism for the grant transfer determined: December 2003
- Recruitment of a national expert initiated: December 2003

## Planned key activities and achievement in 2005

Table 4 summarizes achievements and the status of key activities until now.

**Table 4. Achievements and the status of key TA activities by August 2005**

Activity item	Planned timing as per Project Document	Achievement and status in 2004
a) Design of public awareness campaign to promote phase-out of CFCs.	2003 - 2005	Design of and awareness strategy was designed and approved by the social communication office of SEMARNAT. Video was prepared and demonstrated. Printed materials, advertisements in specialised journals were produced and are in preparation. The official closure of the CFC production in Mexico was organised on 9 September 2005. It was attended by the government, academia, business and industry circles, NGO's, Ozone and Fund Secretariat, representatives from some Latin American countries, UNIDO and other UN agencies.
b) Design and conduct market study to fully characterize remnant demand of CFCs in Mexico.	2003 -2004	Contract of the national expert that will develop the National Strategy for CFC Management in México was issued. Implementation is continuous in 2005 and years after based on the grant to be provided in the 4 <sup>th</sup> tranche.
c) Prepare consumer sector phase-out plan to submit to MLF for approval of funds necessary for phase-out.	2003 - 2004	Refrigeration sector CFC phase-out plan (NPP) submitted to the 42 <sup>nd</sup> ExCom and was approved.
d) Customs training programme to control illegal trade in harmony with NPP.	2003 - 2004	The relevant project was included in the NPP submitted to the 42 <sup>nd</sup> ExCom for assistance from the Multilateral Fund. The training program is being organised to take place in September 2005.

Activity item	Planned timing as per Project Document	Achievement and status in 2004
e) Creation of an information and monitoring system on the production, consumptions imports, exports of CFCs and other ODS including a remote communication system via internet.	2003 - 2004	The information and monitoring system has been designed by an information technology company under a contract awarded last year; The development of the software, procurement of the equipment, installation of the system have been completed, trials were run, system operation was demonstrated to SEMARNAT, Customs, UNIDO etc. The training campaign to all users of this system (Customs, Health Ministry and SEMARNAT) is going on.
f) Regular training programmes for the Government and Industry on regulations and enforcement regarding CFC phase-out matters.	2003 - 2004	Organization of Workshops for Government officials in Health, Agriculture, Economy and Environmental Ministries. Execution planned in 2005 using the third tranche of the grant.

### 3.5. Monitoring and reporting activities

The monitoring and reporting mechanism undertaken in 2004 is detailed in Table 5.

**Table 5. Monitoring and reporting activities in 2005**

Activity	By	Timing	Remarks
Financial and technical audit of the 2004 CFC production of Cydsa / Quimobásicos	UNIDO	January 2005	Satisfactory report received. It was submitted to MFS for consideration and was approved at the 45 <sup>th</sup> ExCom
3 <sup>rd</sup> Tranche approval	45 <sup>th</sup> ExCom	April 2005	Completed
Contract with Cydsa Quimobásicos enterprise for compliance, reporting as well as other obligations.	UNIDO Quimobásicos	May 2005	UNIDO Contract No. 2005/069
Progress report to UNIDO based on the contract above	Quimobásicos	May 2005	Satisfactory report received

Activity	By	Timing	Remarks
Financial and technical audit of the 2005 CFC production of Cydsa / Quimobásicos	UNIDO	September 2005	Satisfactory report received. It was submitted to MFS for consideration and approval at the 47 <sup>th</sup> ExCom
4 <sup>th</sup> Tranche approval	47 <sup>th</sup> ExCom	November 2005	Submitted to the Fund Secretariat
Contract with Cydsa Quimobásicos enterprise for compliance, reporting as well as other obligations.	UNIDO Quimobásicos	Upon approval	Planned for December 2005
Supervision	UNIDO SEMARNAT	2005	Several supervision visits were undertaken by SEMARNAT in 2005 and two times by UNIDO (in conjunction with the audits and CFC production cessation.

#### **4. 2006 ANNUAL PROGRAM: OBJECTIVES AND ACTIVITIES**

##### **4.1 ODS Phase-out objectives and disbursement allocation**

The objective of the 2006 Annual Program is to ensure, monitor and verify that the cessation of CFC production is permanently maintained.

UNIDO, on behalf of the Government of Mexico, is requesting the release of the fourth instalment of US\$ 11.85 million to achieve this objective, which is to be disbursed to the following categories:

- US\$ 11,603,300, which will be disbursed to the beneficiary CFC producing enterprise for reducing keeping the production level in accordance with the annual production allowed for 2005 as well as for the permanent and sustainable cessation of CFC production; and
- US\$ 246,700 for implementation of the TA component.

##### **4.2 CFC production phase-out target**

As of 25 August 2005 the Government of México will not authorize any CFC production and CTC import quota to Quimobásicos, the only CFC producer in México.

##### **4.3 Policy measures**



A series of policy measures is going to be implemented during the course of the year 2005 as summarized below.

**Production Quota:** The production quota system is in place from January 2004. The import Quota system of the ODS raw material, CTC is being continued to doubly control the cessation of CFC production in the production sector.

**Regulation for control and ban of production and import of CFCs:** The Government of México continues promoting an agreement between the CFC importers to close the importation, and use in the next years only the stockpile produced during the period prior to the cessation of CFC production at Quimobásicos.

**Table 7. Policy measures to be carried out in 2006**

<b>Legislation</b>	<b>Related Activity</b>	<b>Planned timing in project proposal</b>	<b>Plan in 2004</b>
Production Quota	Continue application of the production quota system	2005 onwards	Production Quota system will be used to continue to control cessation of CFC production through imposition of import Quota on CTC and ban of import for the production of CFCs
Regulation for control and ban of production and import of CFCs	Enactment	As of 2005	Proceeding for the approval by the Parliament

#### **4.4 Technical assistance activities**

Proposed technical assistance activities to be undertaken during 2006 and the following years are summarized below. These activities have been decided based on the priorities of the Government of Mexico with regard to the national ODS phase out strategy.

##### **a) ODS Information monitoring system.**

This system consists of an instrument to monitor permanently the flows and related information of ODS that are imported and exported through all the Mexican customs. It will register the gross sales and use of ODS inside the country and will be capable to follow up the movements in the quota established for the importers of ODS.

The major activities of this item are:

- Regular operation of the ODS information and monitoring system;
- Collection and input of data;
- Supervision and maintenance of the operation of the information system;
- Provision of training on the use of the system, as required;
- Processing import licences through the system;
- Daily use of remote communication system via internet to facilitate training activities and linkage with stakeholders involved.

**b) Technical assistance and training of relevant ministries and agencies.**

It consists of technical workshops for officials of governmental agencies related to ODS management (Environmental Federal Attorney, Customs, etc.) with the aim to train them in ozone layer protection issues and specifically in detection and identification of ODS.

In the courses the participation of national and international experts is envisaged. It will utilize the specific material developed by UNEP.

**c) Technical audit, supervision**

It is planned to carry out technical and financial audits at Quimobásicos in the first quarter of each year during the period of 2006-2009, to authenticate compliance with the Agreement between Mexico and the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol. The audits will review compliance of the previous year.

The audits will focus on and verify:

- i) There has been no entry of CTC into the plant after the closure date of CFC production;
- ii) Verification of stock, purchase and use of HF for HCFC-22;
- iii) Production verification of Plants 1 & 2,
- iv) Stock verification of finished goods, CFC-11 and CFC-12, and reduction over the year;
- v) Verify consumption norms of Chloroform and HF for the production of HCFC-22;
- vi) Changes carried out in the plant, equipment additions, modifications, etc;
- vii) Any other checks to be made to confirm full compliance.

Through this instrument SEMARNAT with the assistance of UNIDO will annually verify the cessation of CFC produced in Mexico and take the necessary measures to ensure compliance with the Montreal Protocol.

The results of the verification audits will be submitted in form of audit reports to the Fund Secretariat and for the information of the ExCom.

**d) Development and implementation of a communication strategy**

This item will allow the Government of Mexico and SEMARNAT through the National Ozone Unit to communicate to specific publics the advances of México in the process of implementation of the Montreal Protocol and in particular, the closure of CFC production in México. This program is implemented in close coordination with the Social Communication Office of SEMARNAT.

The major activities are:

- Design and development of a communication strategy;
- Design and publication of materials in different media;
- Special events.

**e) Local and international travels**

This item is related to the local travels of the national experts, governmental officials and national ozone unit personnel for the different activities related to this technical assistance program.

**f) General project management**

Assist the Ozone Protection Unit in coordinating and managing the technical assistance project for the CFC Production Sector Phase-out Plan, specifically in the preparation of reports, design, development and implementation of the different programs included in this project, development and management of databases for ODS and support the technical audits of CFC production closure.

Major activities:

- Recruitment of national experts
- Following up on the Monitoring system, the National Strategy for CFC Management and other related programs.

**g) Time schedule**

The planned activities will be implemented on continuous basis, except the technical and financial audits, which will be carried out annually in the first quarter of the year with reporting to the second meeting of the ExCom on the compliance of the previous year.

**g) Estimated costs of activities**

The estimated cost of the project by activity is listed in the table below.

**Table 9. Estimated costs of TA activities, US\$**

	<u>Activity</u>	<u>2003-2004</u>	<u>2005</u>	<u>2006 - 2009</u>
<b>A</b>	<b>ODS Information and Monitoring System</b>			
	Elaboration of Terms of Reference of the project for ODS Information and Monitoring System	3,500		
	Design, implementation and operating of the ODS Information and Monitoring System	227,000	40,000	46,700
	Acquisition of Remote communication system via internet to facilitate training activities and linkage with stakeholders involved.	30,000		
<b>B</b>	<b>Technical assistance and training of relevant ministries and agencies</b>			
	Training workshop	37,300	10,000	10,000
<b>C</b>	<b>Technical Audit supervision</b>			
	Audit to a CFC production factory	16,000	16,000	70,000
<b>D</b>	<b>Development and implementation of a Communication strategy</b>			
	Implementation of the communication strategy	37,500	89,000	70,000
<b>E</b>	<b>Local travels</b>	12,000	5,000	20,000
<b>F</b>	<b>General project management</b>			
	Recruitment of a national experts	50,000	30,000	30,000
	<b>TOTAL</b>	413,300	190,000	<b>246,700</b>
<b>G</b>	<b>Carry-over from previous approvals</b> (to be used for awareness, monitoring and national experts over the period)			124,436
<b>H</b>	<b>GRAND TOTAL</b>			371,136

#### 4.5. Monitoring and reporting activities

Annual progress reports on the implementation of the programme and cessation of CFC production will be prepared by SEMARNAT and UNIDO for the consideration of the Secretariat and the ExCom prior to the second Meeting of the ExCom each year in 2006-2009.

**Table 10. Monitoring and reporting activities in 2006 -2009**

<b>Activity</b>	<b>Responsible</b>	<b>Timing</b>	<b>Remarks</b>
Approval of 4 <sup>th</sup> Tranche and Implementation Programme 2006 - 2009	ExCom	November 2005	47th ExCom
Contract with the enterprise for compliance, reporting as well as other obligation	UNIDO Quimobásicos	December 2005- January 2006	Modality for preparation of the contract and the contractual obligation will follow the previous modality with the addition of the clause of permanent cessation of CFC production.
Progress report to UNIDO based on the contract above	Enterprise	To be decided in the Contract	-
Audit for verification of CFC production phase-out	Auditor	1 <sup>st</sup> Quarter of each year 2006 – 2009	-
Supervision and regular monitoring	UNIDO SEMARNAT	During 2006 – 2009	Periodically

# Technical and Financial Audit of the CFC plant of Cydsa / Quimobásicos Monterrey, Mexico (Year 2005)

**Project:** MEX/PRO/40/INV/115, “Sector Plan for Phasing out of CFC-11 and CFC-12 in the Production Sector” fourth tranche)”

**ESS JAY CONSULTANTS:** Mr. T. K. Padmanabhan, Team Leader  
Mr. V. K. Trehan, Engineer, Technical Expert  
Mr. H. Mahajan, Chartered Accountant, Financial Expert

**SEMARNAT:** Mr. A. Sanchez-Guevara, Ozone Protection Unit Coordinator

**UNIDO:** Dr. T. Gróf, Unit Chief, Project Manager

Date of submission: 23 September 2005

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## **EXECUTIVE SUMMARY**

### **BACKGROUND**

- 1) The Executive Committee entered into an Agreement with Mexico, by which the only plant producing CFCs in Mexico will be assisted with funds to meet international obligations under the Montreal Protocol.
- 2) The Agreement (UNEP/OzL.Pro/ExCom/40/50) stipulates the CFCs production that is permissible to Mexico for specified years and the funding that will be made available for compliance.
- 3) The cited Agreement uses the following terms to describe the CFC production permitted for the plant.
  - a) “**Maximum Allowable Production**” 2003 to 2010. Annual production limit in accordance with the Montreal Protocol.
  - b) “**Maximum Production Levels Agreed**” 2003 to 2005. This stipulates the maximum production (22,000 MT) permitted under the cited Agreement for the Mexican - Production Sector. The Plant will cease CFC production thereafter.
- 4) The Agreement stipulates a “Maximum Allowable Production” of 6,379 MT in 2005, which is a part of the “Maximum Production Levels Agreed” limit of 22,000 MT in the years 2003-2005.
- 5) As certified by earlier audits approved by the Ex-Com, the plant produced 8,694 MT of CFCs in 2003 and 8,044 MT of CFCs in 2004 against the “Maximum Production Levels Agreed” of 22,000 tonnes for the years 2003-2005. Hence, the permitted total production for CFCs in 2005 is 5,262 MT. With this production in 2005, the “Maximum Production Levels Agreed” of 22,000 MT for 2003-2005 has been utilised and hence the plant is not eligible for CFC’s production in future.
- 6) The disbursement of funds under this Agreement to the beneficiary enterprise is contingent on independent verification and report of CFC production.
- 7) The management of Quimobásicos Factory, Monterrey, Mexico has declared the closure of the plant for CFCs production and their desire to switch over to HCFC-22 production.

### **OBJECTIVE OF THE AUDIT**

- 8) To establish the CFC-11 and CFC-12 production level of Cydsa/Quimobásicos Factory, Monterrey, Mexico for the period 1 January 2005 - 31 August 2005 and verify its compliance with the Agreement, UNEP/Ozl.Pro/ExCom/40/50.

### **VERIFICATION TEAM**

- 9) The audit was carried out by Ess Jay Consultants who were accompanied by UNIDO and SEMARNAT staff to ensure the right process under Ex-Com Guidelines was followed.



### **PLANTS PRODUCING ODS**

- 10) The Quimobásicos Plant at Monterrey has two refrigerant production units of Allied Signal Technology. Both plants have a common control room with sophisticated PLC based integrated control systems. Plant 1 (commissioned in 1963) produces only HCFC- 22, and Plant 2 (commissioned in 1983) produces CFC-11 and CFC-12.
- 11) Both plants have a swing-over capability but are running in the modes indicated, since 1995. The average swing-over time from CFC-11/CFC-12 to HCFC-22 or vice versa is 15 days and the plant deems the swing over time as uneconomical and has decided to dedicate product manufacture in Plants 1 & 2 as indicated above.
- 12) Thus, only the plant producing CFCs (Plant 2) was audited in detail whereas the audit of Plant-1 (producing HCFC-22) was carried out solely to confirm that it produced only HCFC 22.

### **SUMMARY OUTCOME OF AUDIT**

- 13) The plant produces the following ODSs:  
CFC-11, CFC-12 and HCFC-22.
- 14) Though, only CFC-11 and CFC-12 is produced by the plant, there is import of other CFCs e.g. CFC-113, CFC-114, CFC-115, CFC- 124 etc. to cater to domestic demand.
- 15) The field verification of January-August 2005 CFCs production at Quimobásicos factory confirms the production, inventory and sales data submitted by the Plant in response to the questionnaire.
- 16) Quimobásicos has produced **5,201 MT** of CFC-11 and CFC-12 in the current audit period.
- 17) The actual production of CFC-11 and CFC-12 is within the “Maximum Allowable Production”, (i.e., the CFC Production Freeze Target for Mexico under the Montreal Protocol) of **6,739 MT** for the year 2005.
- 18) The plant has also adhered to a total production of maximum 22,000 MT in the period 2003-2005 under the Agreement. Against this commitment, the production was:
  - a) 8,694 MT in 2003;
  - b) 8,044 MT in 2004; and
  - c) 5,201 MT in 2005.A total of **21,939 MT**, which is **61 MT less** than the 3-year “Maximum Production Levels Agreed” limit of **22,000 MT**.
- 19) The company produced 5,201 MT from January 05 to 25 August 2005 and has permanently ceased CFC production.
- 20) The CFC-11 & CFC-12 closing stock verified at the end of August 2005 is 4,140 MT. It was reported that there was no incident or occurrence leading to major loss of raw material/ finished product. The auditors verified this by examining relevant records.

- 21) The plant was stopped in the month of June to carry out a modification in the reactor to make it capable of producing a higher ratio of CFC-12 to CFC-11. The critical part of the reactor was lined with Hastelloy C to minimise excessive corrosion in the reactor as a result of the more corrosive nature of CFC-12 production.
- 22) The management of the Plant informs that they plan to produce HCFC-22 in Plant 2 after carrying out necessary modifications. The management indicated their decision to carry out the necessary plant modifications (as mentioned in Para 4.g) and commence production in HCFC-22 mode by the end of September 2005.
- 23) The field verification confirmed and found adequate, the activities planned by the Government and the enterprise for the permanent cessation of CFC production
- 24) The swing over of the operation of Quimobásicos Plant 2 for HCFC-22 production is permitted under the Agreement.
- 25) The Auditors recommend to UNIDO to continue annual monitoring of the plant. Yearly audits in the future will focus on checking and confirming from financial and technical perspectives:
  - i) There has been no entry of CTC into the plant after the closure date of CFC production;
  - ii) Verification of stock, purchase and use of HF for HCFC-22;
  - iii) Production verification of Plants 1 & 2,
  - iv) Stock verification of finished goods, CFC-11 and CFC-12, and reduction over the year;
  - v) Verify consumption norms of Chloroform and HF for the production of HCFC-22;
  - vi) Changes carried out in the plant, equipment additions, modifications, etc;
  - vii) Any other checks to be made to confirm full compliance.

**C-11 AND CFC-12 PRODUCTION AUDIT SUMMARY**

**(January 2005 – August 2005), MT**

Table 1: Annual production data

	<u>Item</u>	<u>Data</u>	<u>Remarks</u>
A	Maximum Production Level Agreed for 2005 (MT)	5,262	(Production freeze target for Mexico) <b>(F-D)</b>
B	Actual Production 2005 (MT)	5,201	(Gross production)
C	Difference +/- (MT)	-61	(Under produced)
D	Actual Production in 2003 & 2004 (MT)	16,738	
E	Total Production in 2003-2005 (MT)	21,939	
F	Max. Allowable Production 2003-2005 (MT) under the Agreement (MT)	22,000	(In accordance with the Agreement)
G	Unutilised quota of 2003-2005 "Maximum Production Level Agreed" (MT)	61	
H	Opening Stock as of 1 <sup>st</sup> January 2005 (MT)	2,435	
I	Other additions	0	
J	Total opening stock as of 1 <sup>st</sup> January 2005 (MT)	2,435	<b>(H+I)</b>
K	Gross production (MT)	5,201	
L	Filling & other losses (-)/ Surplus(+)*(MT)	-4	Filling loses are accounted as part of gross production and adjusted against Max Production Level Agreed
M	Net production (MT)	5,197	Gross Production minus Losses <b>(K-L)</b>
N	Domestic Sales (MT)	839	
O	Export sales (MT)	2,653	
P	Total sales (MT)	3,492	<b>(N+O)</b>
Q	Closing stock August 2005 (MT)	4,140	Opening stock plus net production minus sales. <b>(J+M-P)</b>

## **DETAILED REPORT ON THE AUDIT**

### **AUDIT TEAM, DATES OF SITE AUDIT, BROAD VERIFICATION STEPS**

26) The audit was undertaken in line with the Guidelines of Executive Committee for verification of ODS production phase out (UNEP/Ozl.Pro/ExCom/32/33, dated 24th October 2000).

a. Site audit team:

27) Ess Jay Consultants:

- i) Mr. V. K. Trehan, Engineer: Technical expert;
- ii) Mr. Hitesh Mahajan, Chartered accountant. Financial expert;

28) The following persons from the Government of Mexico and UNIDO accompanied the audit team to ensure that the right process was conducted in terms of ExCom Guidelines for verification of CFC production phase-out and the Agreement:

- i) Mr. A. Sanchez-Guevara, Ozone Protection Unit Coordinator, SEMARNAT
- ii) Dr. T. Gróf, Unit Chief, Multilateral Environmental Agreement Branch, UNIDO.

b. Dates of audit:

The Audit was undertaken on 5th, 6th and 7th of September 2005 (three days on site).

29) UNIDO prepared a Terms of Reference for the verification mission. The Auditor was selected according to UNIDO's financial rules and based on the Terms of Reference.

c. Broad methodology adopted for audit:

30) Prior to the field visit UNIDO made available to the selected Auditor the Production Sector Closure Agreement, the Guidance Document UNEP/Ozl.Pro/ExCom/32/33, dated 24th October 2000, the results and data of the previous audit, the baseline information and annual data reported by the enterprise.

31) Cydsa / Quimobásicos duly completed the Questionnaire prepared by UNIDO and Ess Jay Consultants in line with UNEP/Ozl.Pro/ExCom/32/33, dated 24th October 2000 and returned it to the auditors prior to the site inspection.

32) During the site visit, the enterprise made available to the team of auditors the services of required managers and experts who answered all queries in an open and professional way. Access was provided to all premises of the Plant and to all documents, daily production logs, sales and financial records requested by the auditors for the purpose of the audit and validation of the data provided by the Plant in the Questionnaire.

33) A round of the Plant was taken for precise understanding of operations and record keeping. The system of measurement for raw material receipt and issues, production, sales and closing stock were reviewed. The following operational and statutory records for the year 2005 up to August 2005 were examined:

- a) Raw material purchase and issue records;
  - b) Daily production logs and production records;
  - c) Process parameters records;
  - d) Quality control records;
  - e) Stock transfer and record for storage of stocks at strategic location (storage on contractual basis outside the Plant), consignment storages - storages at all points of sales (Monterrey and Mexico City);
  - f) Stock register in value as per books of accounts for the year 2004 to check the opening stock and also Audited Balance Sheet for the year 2004 for cross checking;
  - g) Sales invoices;
  - h) Monthly VAT returns filed with revenue authority for claim of IVA, which gives the monthly purchase of raw materials and sales of finished goods;
  - i) Import quotas issued for CTC and HF and actual import entered into Mexico based on the records of Customs.
- 34) The verification of the data provided by the enterprise was carried out as follows. The data is annexed as a part of this report.
- a) Random dates in January, February, June & August were selected for studying in-process parameters, laboratory and analytical records for both plants;
  - b) Volume and value of opening and closing stock was verified;
  - c) Purchase invoices (all invoices for CTC and HF in the year 2005), on randomly selected dates, incoming and issues from plant stores were checked;
  - d) On randomly selected dates in January, February, June & August 05 hourly production records were cross checked and compared with the reported daily production;
  - e) Technical norms were checked for consistency;
  - f) From filled CFC and HCFC stocks, samples were taken to check vapour pressure, weight and gas chromatography analysis.

### **VERIFICATION OF PLANT RECORDS AND PROCESS ADOPTED**

#### a. Overview of plant and its production activities

- 35) A brief presentation was made by the enterprise about the systems of operation and maintenance. Plant visit was taken for precise understanding of operations and record keeping in various Departments.
- 36) Each department is maintaining material accounting records, and the final consumption of raw materials is arrived through purchase, opening and closing stock at the enterprise level. The overall method of record keeping is found satisfactory. Entries in books of account are matching with the plant record that was ascertained through random verification.

- 37) The enterprise has two plants located in the same premise. The plant is ISO 9001 and ISO 14001 certified. Both plants are very well maintained. CFC-11 and CFC-12 are co-produced by CTC and HF reaction from a single reactor.
  - 38) The raw material storage of HF (Hydrofluoric Acid) is common for both plants. However, flow meters are installed to measure the quantity sent to each plant. HF handling is carried out in an enclosed chamber. HF sensors are installed at various points for sounding alarm signals to detect leakage for timely action.
  - 39) One plant (Plant 1) was commissioned in 1963 and the other (Plant 2) was commissioned in 1983. Each plant has the capacity to produce 11,826 Tonnes / year of CFC11/12. Both plants have a common control room with sophisticated PLC based control system. The hazardous material handled in the plant's equipment and pipelines are located in a closed chamber connected to a central absorption system to handle any emergency safely.
  - 40) Though each plant can be operated in both modes, CFC-11/CFC-12 or HCFC-22, since 1995, the old plant (Plant 1) is being operated solely on HCFC-22 and the new plant (Plant 2) on CFC-11/CFC-12. The feedback from the Plant personnel is that swing-over time is 15 days to get the right quality material. Based on the requirement and economics of operation the enterprise decided to operate the plants in a product-dedicated mode.
  - 41) The Plant 2, which was operating on CFC-11/CFC-12 in 2005, has produced 5,201 MT until August 24, 2005 and thereafter ceased production of CFCs. This is about 66 % of capacity utilization of this plant, for that period. (5,201 / 11,826 / 12\*8 months).
  - 42) The ratio of CFC-11 and CFC-12 can be varied as per requirement.. The enterprise took trials in 2004 for production of CFC-12 only, by recycling CFC-11.
  - 43) There has been an increase in the ratio of CFC-12 to CFC-11 in 2005. This is the result of a management decision taken in view of the projection of low demand in the future for CFC-11. The plant was stopped in the month of June/July 2005 to carry out a modification in the reactor to make it capable of producing a high ratio of CFC-12 to CFC-11, based on the experience of the trials in the previous year. The critical part of the reactor was lined with Hastelloy C to minimise corrosion in the reactor as a result of the high proportion of CFC-12 in the mix. The MOC of the original reactor was prone to high levels of corrosion that could affect the safety of the plant. After the reactor was lined to withstand higher levels of corrosion, the plant converted 382.8 MT of CFC11 to 326.43 MT of CFC-12. This was necessitated by the steeply falling demand for CFC-11 in comparison to CFC-12.
  - 44) The management of the plant declared cessation of CFC 11 and CFC 12 production on 25<sup>th</sup> August 2005 and commenced conversion activities to shift the plant to HCFC-22 production. The management made a presentation to the auditors on the activities to be carried out for permanent changeover from CFC to HCFC. The auditors found them satisfactory and verified the ongoing modification activities till the date of audit.
  - 45) The plant manufacturing CFCs was audited in detail. The methodology adopted and the process verification along with the copies of documents are listed below:
    - b. 2005 Opening Stock Verification
  - 46) The closing stock of December 2004 was verified for both CFC-11 and CFC-12. The stock records in the plant warehouse were checked.
-

- 47) Balance Sheet & Statement of operations Account duly audited by an external auditor for the year ending December 2004 was checked and co-related with inventory valuations (both in quantity and value) with the stock records as per the company's books of account.
- 48) The financial records verified for CFC-11 and CFC-12 for the month of December 2004 are the Audited balance sheet, stock register and last year's data audited by Ess Jay Consultants.
- 49) Based on these financial records and verification of raw material purchases, issues and inventory, the following are the accepted stock values in tons.
- 50) Attached, as Annexure 1 is the audited Balance Sheet for the year 2004 showing the inventory valuations as on January 1, 2005.

Table 2: Opening stock at 1 January 2005

Opening Stock of raw material CTC	763.3 MT
Opening Stock of raw material HF	277.9 MT
Opening Inventory of CFC-11	593 MT
Opening Inventory of CFC-12	1,841 MT

- 51) Attached, as **Annexure 1** is the audited Balance Sheet for the year 2004 showing the inventory valuations as on January 1, 2005.

c. 2005 Raw Material (RM) Procurement Verification

- 52) Both the major raw materials HF and CTC used for manufacture of CFC-11/CFC-12 are procured from outside. The material procured is unloaded in raw material tanks, but if there is no space, the cargo is not unloaded but kept waiting; the stock at any given point of time includes stock in raw material tanks and the cargo waiting to be unloaded.
- 53) The list of total raw material (CTC and HF) purchases was taken from the finance department based on the approved quota from Government of Mexico to import the same. All the invoices for import of raw materials were checked; the quantity on the invoices was cross checked with the purchase figure in the purchase account and also the amount shown in the VAT returns submitted by the company to Revenue Authorities to claim IVA back from the Government and were found to be consistent. The system for raw material consumption accounting was also reviewed and found satisfactory.
- 54) The monthly consumption is calculated as the difference in inventory and purchases made during the month. The allocation of raw material consumption (combined) for CFC-11 & CFC-12 is done by readings on flow meters. The allocation of raw material consumption between CFC-11 and CFC-12 is done by way of norms. The monthly raw material accounting report for the entire year is enclosed as **Annexures 2A & 2B**.

Table 3: Raw material purchases

Total Purchase of CTC in the year 2005	11,219 MT
Total Purchase of HF in the year 2005	7,356 MT

d. CFC Production Verification:

- 55) The hourly feed on the randomly selected days (26th January, 20<sup>th</sup> February, 11th June and 25th August 2005), was integrated on a day-basis to verify the daily production, which is stocked in a 'day tank' and was found to be consistent with records.
- 56) The daily production is recorded by reading the level gauge installed on day-tanks. The day-tanks have a level measurement facility and with the help of a pre-calibrated level-to-weight chart for each tank, production is calculated for every shift. Daily production is recorded by cumulating such records for all three shifts of the day. Each product has two-day tanks and before transfer to the main tank, quality is approved by quality control lab.
- 57) All final records are based on month-end accounting. The monthly reported production comes from inventory difference in the day tanks, main tanks and the material transferred from plant to filling station. This is counted as gross production. Saleable filled stock is counted as net production and difference is considered as loss / surplus.
- 58) Gross production is measured at the main tank and net production on the sales and final inventory. The enterprise has a good recovery system in the filling station for CFC-12 and HCFC-22, which ensures losses of only insignificant quantity (0.29%).
- 59) The Plant has an excellent recovery system of residual gases in the filling pipeline, returned packages for refilling and the sampling point. Such gases, which are sucked back, are accounted as part of production.
- 60) On these dates, (26th January, 20th February, 11th June and 25th August 2005) verification of process parameters and quality analysis data were checked and found satisfactory. Sample sheets of production logbook, quality records are included as **Annexures 3A & 3B**.
- 61) The raw material consumption norms for HF and CTC were verified and found to be consistent in 2005 over the months. The raw material consumption norms for the year are comparable to the past years.

Table 4: Raw material consumption ratios

<u>Raw Material</u>	<u>CFC-11</u>	<u>CFC-12</u>
Carbon tetrachloride (tones / ton of product)	1.1489	1.3121
Hydrogen fluoride (tones / ton of product)	0.1638	0.3739

- 62) The norms are comparable to good plants in the world.
- 63) The trends of production of CFC-11 and CFC-12 plotted against CTC and HF consumption up to August 2005 is shown graphically at the end of the **Ex-Com Form 4**.



e. Production to packaging transfer

64) Based on requirement, various packages are filled and transferred to the warehouse immediately. No stock is maintained in the filling station. The packaging bottles and cylinders are first evacuated and filled with the required gas. The system is connected for recovery of held up gas in tubes and pipelines. The following non-returnable packagings are used:

Jugs - 15 lbs, 30 lbs & 50 lbs

Bottles / cans 340gms, 1kg

65) The recycled packaging materials are cylinders, tonners and ISO containers for filling bulk quantities. The process for filling bulk containers is the same except that the package is first cleaned, inspected and painted if needed.

66) The enterprise's products brand name is Genetron. However, for export purpose, generic packaging is also used.

67) The filling system is semi-automatic. Records of filled material with different packaging are maintained on daily basis and entered in the system the next day. The cumulative figure at the end of the month gives the total quantity of material filled during the month. This figure is used for calculating the monthly net production.

68) A sample review of the system of record keeping for filled material was carried out at stores and filling station and found to match.

69) Samples of filled material was taken, one each of CFC-11, CFC-12 and HCFC-22. The pressure, weight and gas chromatography analysis was done and the auditors found the results match physical characteristics of the product. A copy of the GC analysis is enclosed as **Annexure 4**.

f. Sales and Closing Stock

70) The actual invoices raised in the month are accounted as sales. The monthly statement of sales is enclosed as **Annexure 5** (Month wise break-up of product wise CFC sales for Domestic and Export markets).

71) Verification was done by random selection of invoices and verifying their account in the sales register and VAT returns.

72) Closing Stock of raw materials and finished goods are computed and verified based on data given and verified as per the stock records and the un-audited balance sheet prepared by the company. The closing stock figures in financial records were then crosschecked with the quantities audited by the technical consultant. They are shown in **Annexure 6** (Monthly plant report, quantity and value of closing stock as per un-audited balance sheet).

Table 5: Closing stock on 31 August 2005

Closing Stock of raw material CTC	48.4 MT
Closing Stock of raw material HF	231.3 MT
Closing Inventory of CFC-11	355.7 MT
Closing Inventory of CFC-12	3783.6 MT

g. VAT Returns

- 73) The company files VAT returns on a monthly basis with the Revenue Authorities. An external auditor duly audits this every month. The return is being filed to claim the difference between tax 'paid' and 'tax to-be-collected' from the Government for extra taxes paid by the company.
- 74) The month of January 2005 was chosen for detailed verification of all the sales invoices to check authenticity of the data and record keeping systems. VAT returns for the month of January 2005 was checked by the auditors during the course of the audit and found that the data for purchase and sales match the figures shown in the books of account. Copy of the duly audited monthly VAT returns for the month of January to May 2005 is attached as **Annexure 7**. (Till the date of audit, June, July & August 2005 VAT returns were not audited by the external auditor).
- 75) The data confirms the sales (both domestic and exports), purchases (both domestic and imports) made by the company during the month. **Attachment 1** shows the checklist of the audit process followed in keeping with the Guidelines and step taken in addition to the Guidelines.

**CESSATION OF CFC PRODUCTION AND PLANT TO BE MADE SUITABLE FOR HCFC-22 PRODUCTION**

- 76) The Agreement between the Executive Committee and the Government of Mexico pertaining to the sole CFC producer contains two major stipulations:
- a) The 'maximum production level agreed' for the plant is 22,000 MT of CFCs
  - b) This quantity of CFCs production is permitted in the period 2003-2005 only.
- 77) The results of this audit show that the Quimobásicos plant in Mexico has completed CFC production to the permissible level (21,939 MT), in the period January 2003 to 25 August 2005.
- 78) Having done so, they will, from that date, fully comply with the Agreement and cease all production of CFCs.
- 79) The plant will, however, avail the benefit of the proviso in the Agreement allowing it to convert the CFC producing plant to the production of HCFC.
- 80) As a measure of their compliance to the cessation of production stipulation in the Agreement the audit team has obtained the following documents.

- a) Written confirmation from the Director General of Quimobásicos that they have ceased production of CFCs. (**Attachment 6**)
- b) Equipment changes made/and to be made to make the plant compatible to HCFC-22 production (**Attachment 2**). The auditor's note on this subject is presented in **Attachment 5**.
- c) The Ministry of Environment (SEMARNAT) revoked the CTC import licence on 6 September 2005 and banned the import of CTC with immediate effect, including any shipments in transit through the customs authorities. All responsible authorities were duly informed of this decision. Letter from the Government of Mexico confirming that Quimobásicos will not, henceforth, be given a license to import CTC is attached (**Attachment 3**).
- d) The physical stock of CTC at the plant is 47.155 MT which will be sold as CTC in the market by Quimobásicos, rendering the stock level of CTC as NIL at the plant (**Attachment 4-2, 4-4 & 4-5**). (The difference in CTC stock reported in Ex-Com Form-4 is because the book stock figures are based on dipstick readings whereas the stock for disposal is based on actual weight.)

### **RECOMMENDATION**

- 81) Perform yearly audits in the future to check and confirm:
  - a) There has been no entry of CTC into the plant after the closure date of CFC production;
  - b) Verification of stock, purchase and use of HF for HCFC-22;
  - c) Production verification of Plants 1 & 2,
  - d) Stock verification of finished goods, CFC-11 and CFC-12, and reduction over the year;
  - e) Verify consumption norms of Chloroform and HF for the production of HCFC-22;
  - f) Changes carried out in the plant, equipment additions, modifications, etc;
  - g) Any other checks to be made to confirm full compliance.

The above will be carried out from financial and technical perspectives.

### **EXECUTIVE COMMITTEE FORMATS & COMMENTS**

- 82) The Formats as given in Doc No 32/33 dated 24 October 2000 were filled and submitted by the plant prior to the physical verification and were verified at the time of site audit.

Major observations:

(Ex-Com Forms 1, 2, 3 and 4 annexed)

- a) The present verification audit of the 2005 production at Quimobásicos plant was carried out with the aim to verify the implementation of the Agreement between Mexico and the Executive Committee for the phase-out of CFCs in the production sector.
  - b) Data on plant location, names of respondents etc. were given by the plant;
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- c) The combined annual capacity of both plants in CFC terms is 23,652 MT.
- d) Both plants have equal capacity in CFC terms.
- e) Both plants are in good condition and well maintained.
- f) Data submitted for CFC-11 and CFC-12 from 1995 onwards are for Plant 2, as Plant 2 has been producing CFCs, whereas Plant 1 produces only HCFC-22 and there has been no swing over in the two plants since 1995.
- g) HF in-house production was discontinued from Dec. 2001.
- h) CTC was always imported with import license issued by the Government of Mexico.
- i) The Ministry of Environment (SEMARNAT) revoked the CTC import licence on 6 September 2005 and banned the import of CTC by Quimobásicos with immediate effect, including any shipments in transit, through the customs authorities (see Attachment.3).
- j) The average production per day for the year 2005 has been higher than the average production per day for the year 2004. The plant has been operated at 34.9 TPD against the level of 30.69 TPD in 2004 and the nominal rate of production of 36 TPD (11,826 TPA/330 days).
- k) The enterprise has reduced production in 2005 by around 35% against the year 2004. (2005 production: 5,201 MT; 2004 production: 8,044 MT; 2003 production: 8,694 MT).
- l) The decrease in production in 2005 was achieved by limiting the number of operating days (closing CFC production in August 2005) with the aim to remain within the allocated quota.
- m) Net Loss is 4 MT, which is 0.08% of Gross Production. This loss is comparable to the best plants in the world. The loss is taken as a part of gross production and accounted against the 'Maximum production Agreed'.
- n) CTC and HF norms are consistent over the years and comparable to good plants in the world.

Table 6: CTC and HF norms

<u>Raw Material Consumption ratio</u>	<u>CFC-11</u>	<u>CFC-12</u>
Carbon tetrachloride (tones/ ton of product)	1.1489	1.3121
Hydrogen fluoride (tones/ton of product)	0.1638	0.3739

- o) The ratio of production of CFC-12 to CFC-11 in the years 2003, 2004 & 2005 are shown in Table 7. The change in the ratio of CFC-12 to CFC-11 in 2005 is the result of a management decision taken in view of projected low future CFC-11 demand.

Table 7: Annual ratio of production of CFC-12 to CFC-11

<b>Year</b>	<b>CFC-11 (MT)</b>	<b>CFC-12 (MT)</b>	<b>Ratio (CFC-12 / CFC-11)</b>
2003	1,291	7,401	5.73
2004	1,177	6,867	5.83
2005	278	4,923	17.71

- p) The total year 2005 consumption of CTC by the end of August 2005 was verified as 6,791 MT.
- q) In 2005 the production was accounted in both gross and net basis and the losses were calculated as the difference between the two.
- r) Data of Plant 1 producing HCFC-22 is included in Sheet Ex-Com Form 4. The HF consumption balance was verified for both plants as they have a common storage of the raw material.
- s) The consumption of HF until the end of August 2005 (CFC & HCFC) as verified was 4,446 MT. Verification of consumption of the 2 plants is given in the detailed portion of the report
- t) Based on the data supplied by the enterprise and random checks, review of norms, logbooks and cross-check calculations carried out by the auditors during the verification visit, Ess Jay Consultants confirm the monthly and annual production, sales and inventory data as given in Ex-Com formats attached as Forms 1, 2, 3 & 4.

