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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)"

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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 CFC's (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

	Item	Data	Remarks
A	Maximum Production Level Agreed for 2005 (MT)	5,262	(Production freeze target for Mexico) **(F-D)**
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 1st January 2005 (MT)	2,435	
I	Other additions	0	
J	Total opening stock as of 1st January 2005 (MT)	2,435	**(H+I)**
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 **(K-L)**
N	Domestic Sales (MT)	839	
O	Export sales (MT)	2,653	
P	Total sales (MT)	3,492	**(N+O)**
Q	Closing stock August 2005 (MT)	4,140	Opening stock plus net production minus sales. **(J+M-P)**

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 25th 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, 20th 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

Raw Material	CFC-11	CFC-12
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;

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

Raw Material Consumption ratio	CFC-11	CFC-12
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

Year	CFC-11 (MT)	CFC-12 (MT)	Ratio (CFC-12 / CFC-11)
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.

Ex-Com Form 1

Questionnaire for ODS production Phase Out Verification (Including Gradual Closure)

a. Plant identification

Name of enterprise:	Quimobásicos, S.A. de C.V.
Plant reference number:	N.A
Sector plan number:	MEX/PRO/40/INV/115
SRI # :	N. A
Address of the plant :	Ave. Ruiz Cortines # 2333 Pte, Monterrey, N.L. México
Contact person(s) and functional title:	Sergio Lozano García, General Manager
Telephone number:	(52) 83054601
Fax number:	(52)83054602
E-mail address:	selozano@ecydsa.com

b. Verification Team Composition

Ess Jay Consultants:	Vibhash Kumar Trehan, engineer, technical expert Hitesh Mahajan, chartered accountant, financial expert
Accompanied by:	
SEMARNAT	Agustin Sanchez -Guevara, Ozone Protection Unit Coordinator
UNIDO Multilateral Environmental: Agreement Branch:	Dr. Tamás Gróf, Unit Chief, project manager
Dates of plant visit:	5th, 6th and 7th September 2005
Duration of visit:	Three days

Ex-Com Form 2

2. Questionnaire for ODS production Phase Out Verification (Including Gradual Closure)

A. Plant history

Date of construction: Line 1 = 1963, Line 2 = 1983

ODS Products	No of lines	Capacity in baseline year	Production											
			Baseline year (aver. 95-97)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
CFC-11	2 [1]	23,652	2,586	2,411	3,051	2,297	1,020	1,225	1,307	851	757	1,292	1,177	278
CFC-12	2 [1]	23,652	7,714	9,473	7,156	6,513	4,658	4,305	6,238	5,790	4,894	7,402	6,867	4,923
CFC-13		0	0	0	0	0	0	0	0	0	0	0	0	0
CFC-113		0	0	0	0	0	0	0	0	0	0	0	0	0
CFC-114/115		0	0	0	0	0	0	0	0	0	0	0	0	0
Raw material production		0	0	0	0	0	0	0	0	0	0	0	0	0
HF [2]	1 [3]		5,774	5,021	6,203	6,098	4,344	5,210	4,956	4,166	0	0	0	0
CTC		0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Site contains 2 swing plants. Actual capacity of each is 11,826 Tons/year of CFC-11/12. (minimum relation 12 11 = 9:1)

[2] Include HF production for both CFC 11/12 and HCFC-22.

[3] Production of HF at the site was discontinued on December 2001

Ex-Com Form 3

3. Questionnaire for ODS production Phase Out Verification (Including Gradual Closure)

Annual CFC-11/12 quotas, production, sales and stocks since the baseline year

CFC-11	Baseline year (aver. 95-97)	1995	1996	1997	1998	1999	2000 [2]	2001	2002	2003	2004	2005
Quota [1]	11,232	None	None	None	None	None	None	None	None	TOTAL CFCS: 22.000 MT		
Opening stock at beginning of year		143	164	142	78	157	212	175	175	322	82	593
Production	2,586	2,411	3,051	2,297	1,020	1,225	1,307	851	757	1,291	1,177	278
Purchases					167							
Sales	2,604	2,397	3,068	2,349	1,100	1,173	1,342	838	603	1,534	662	515
Loss (Surplus)		(7)	5	13	7	(3)	3	(13)	(7)	3	(4)	0
Closing stock at end of year		164	142	78	157	212	175	175	322	82	593	356

Ex-Com Form 3

3. Questionnaire for ODS production Phase Out Verification (Including Gradual Closure)

Annual CFC-11/12 quotas, production, sales and stocks since the baseline year

CFC-12	Baseline year (aver. 95-97)	1995	1996	1997	1998	1999	2000[2]	2001	2002	2003	2004	2005
Quota [1]	11,232	None	None	None	None	None	None	None	None	TOTAL CFCS: 22.000 MT		
Opening stock at beginning of year		751	236	398	212	1,095	273	405	316	271	361	1842
Production	7,714	9,473	7,156	6,513	4,659	4,305	6,238	5,790	4,894	7,402	6,867	4,923
Purchases					668							
Sales	7,880	9,983	6,994	,663	4,426	5,134	6,105	5,860	4,918	7,310	5,367	2,977
Loss (Surplus)		5	(0)	36	18	(7)	1	(19)	(21)	(2)	(19)	(4)
Closing stock at end of year		236	398	212	1,095	273	405	316	271	361	1,842	3,785

[1] Total CFC production baseline

[2] Quota includes 10% additional allowance for basic needs of Art V Countries

Ex-Com Form 3 (contd.)

Annual HF/CFC ad CTC/CFC ratios

Ratio	Baseline year (aver. 95-97)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
CFC-11												
HF/CFC-11 ratio	0.1622	0.1603	0.1626	0.1638	0.1636	0.1654	0.1665	0.1643	0.1661	0.1632	0.1665	0.1638
CTC/CFC-11 ratio	1.1850	1.1816	1.1821	1.1912	1.1971	1.1999	1.1999	1.1742	1.1694	1.1539	1.1676	1.1489
CFC-12												
HF/CFC-12 ratio	0.3686	0.3643	0.3693	0.3721	0.3686	0.3689	0.3687	0.3725	0.3757	0.3710	0.3780	0.3739
CTC/CFC-12 ratio	1.3367	1.3554	1.3009	1.3539	1.3576	1.3523	1.3285	1.3324	1.3242	1.3116	1.3265	1.3143

Operational days per year

Type of production	Baseline year (aver. 95-97)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
CFC-11		310	303	296	219	226	232	265	217	312	262	149
CFC-12		310	303	296	219	226	232	265	217	312	262	149

Ex-Com Form F4

4. Questionnaire for ODS production Phase Out Verification (Including Gradual Closure)

Monthly CFC-11/12 production and raw material consumption

CFC-11 production and CTC consumption

Month	No of operating days	CFC-11 Production	CTC/CFC-11 ratio	CTC opening stock	CTC procured/or added to stock	CTC closing stock
Jan-05	30	169.272	1.1391	763.283	877.592	208.352
Feb-05	12	57.371	1.1913	208.352	904.871	599.473
Mar-05	30	166.972	1.1287	599.473	1,058.437	279.705
Apr-05	29	119.302	1.1386	279.705	1,139.547	92.361
May-05	22	69.414	1.1715	92.361	1,070.697	263.705
Jun-05	14	65.675	1.1706	263.705	628.401	280.564
Jul-05	8	5.004	1.2130	280.564	161.660	70.690
Aug-05	22	7.788	1.2183	70.690	202.225	48.390
Sep-05	-	-	-	-	-	-
Oct-05	-	-	-	-	-	-
Nov-05	-	-	-	-	-	-
Dec-05	-	-	-	-	-	-
		278 *				

* Excludes 382.812 MT of CFC-11 which was processed into CFC-12

ExCom Form 4 (contd.)

CFC-12 Production and CTC consumption

Month	No of operating days	CFC-12 Production	CTC/CFC-12 ratio	CTC opening stock	CFC procured/or added to stock	CTC closing stock
Jan-05	30.0	957.976	1.2941	763.3	877.6	208.4
Feb-05	12.0	329.100	1.3534	208.4	904.9	599.5
Mar-05	30.0	927.793	1.2823	599.5	1,058.4	279.7
Apr-05	29.0	920.754	1.2936	279.7	1,139.5	92.4
May-05	22.0	640.869	1.3309	92.4	1,070.7	263.7
Jun-05	14.0	400.195	1.3299	263.7	628.4	280.6
Jul-05	8.0	265.221	1.3781	280.6	161.7	70.7
Aug-05	22.0	155.149	1.3841	70.7	202.2	48.4
Sep-05	-	-	-	-	-	-
Oct-05	-	-	-	-	-	-
Nov-05	-	-	-	-	-	-
Dec-05	-	-	-	-	-	-

4923 *

* Includes 326.430 MT of CFC-12 processed from CFC-11.

ExCom Form 4 (contd.)

CFC-11 production and HF consumption

Month	No of operating days	CFC-11 Production	HF/CFC-11 ratio	HF opening stock	HF procured/or added to stock	HF closing stock
Jan-05	30	169.272	0.1572	277.899	663.476	180.183
Feb-05	12	57.371	0.1721	180.183	436.967	430.020
Mar-05	30	166.972	0.1656	430.020	586.380	264.627
Apr-05	29	119.302	0.1663	264.627	810.298	264.098
May-05	22	69.414	0.1668	264.098	516.914	108.312
Jun-05	14	65.675	0.1606	108.312	589.874	173.960
Jul-05	8	5.004	0.1707	173.960	295.017	82.419
Aug-05	22	7.788	0.1624	82.419	591.168	231.297
Sep-05	-	-	-	-	-	-
Oct-05	-	-	-	-	-	-
Nov-05	-	-	-	-	-	-
Dec-05	-	-	-	-	-	-

Ex-Com Form 4(contd.)

CFC-12 production and HF consumption

Month	No of operating days	CFC-12 Production	HF/CFC-12 ratio	HF opening stock	HF procured/or added to stock	HF closing stock
Jan-05	30	957.976	0.3572	277.899	663.476	180.183
Feb-05	12	329.100	0.3912	180.183	436.967	430.020
Mar-05	30	927.793	0.3763	430.020	586.380	264.627
Apr-05	29	920.754	0.3780	264.627	810.298	264.098
May-05	22	640.869	0.3791	264.098	516.914	108.312
Jun-05	14	400.195	0.3651	108.312	589.874	173.960
Jul-05	8	265.221	0.3891	173.960	295.017	82.419
Aug-05	22	155.149	0.3700	82.419	591.168	231.297
Sep-05	-	-	-	-	-	-
Oct-05	-	-	-	-	-	-
Nov-05	-	-	-	-	-	-
Dec-05	-	-	-	-	-	-

Ex-Com Form 4 (contd.)

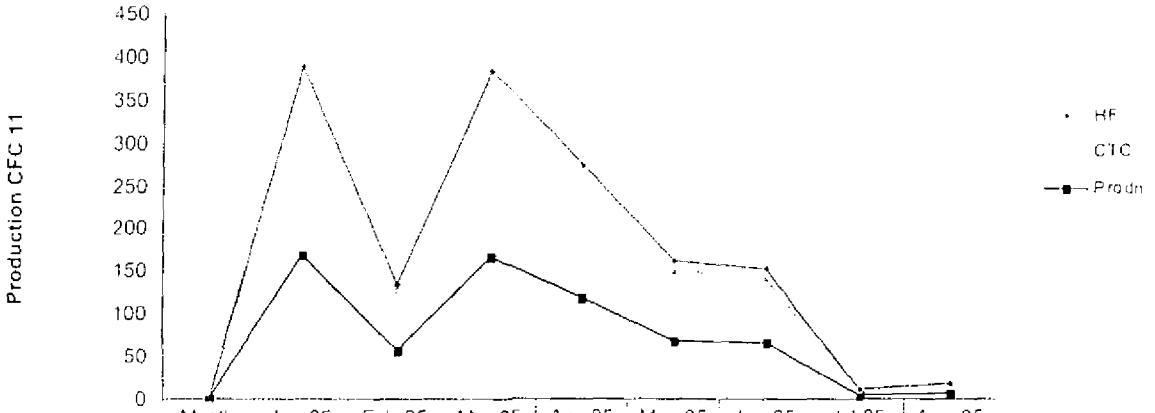
HF consumption and HCFC-22 production

Month	No of operating days	HCFC-22 Production	HF/HCFC-22 ratio	HF opening stock	HF procured/or added to stock	HF closing stock
Jan-05	30	704.390	0.5571	277.9	663.5	180.2
Feb-05	4	74.909	0.6477	180.2	437.0	430.0
Mar-05	31	648.843	0.5780	430.0	586.4	264.6
Apr-05	29	710.767	0.5756	264.6	810.3	264.1
May-05	30	764.026	0.5483	264.1	516.9	108.3
Jun-05	28	630.298	0.5839	108.3	589.9	174.0
Jul-05	22	498.634	0.5693	174.0	295.0	82.4
Aug-05	18	553.536	0.5858	82.4	591.2	231.3
Sep-05	-	-	-	-	-	-
Oct-05	-	-	-	-	-	-
Nov-05	-	-	-	-	-	-
Dec-05	-	-	-	-	-	-

CFM consumption and HCFC-22 production

Month	No of operating days	HCFC-22 Production	CFM/HCFC-22 ratio	CFM opening stock	CFM procured/or added to stock	CFM closing stock
Jan-05	30	704.390	1.4924	1,163.1	378.1	489.9
Feb-05	4	74.909	1.4681	489.9	484.1	864.1
Mar-05	31	648.843	1.4968	864.1	598.4	491.2
Apr-05	29	710.767	1.4802	491.2	1,033.4	472.5
May-05	30	764.026	1.4347	472.5	953.9	316.4
Jun-05	28	630.298	1.4988	316.4	901.0	279.9
Jul-05	22	498.634	1.4871	279.9	626.8	165.5
Aug-05	18	553.536	1.5289	165.5	986.3	305.5
Sep-05	-	-	-	-	-	-
Oct-05	-	-	-	-	-	-
Nov-05	-	-	-	-	-	-
Dec-05	-	-	-	-	-	-

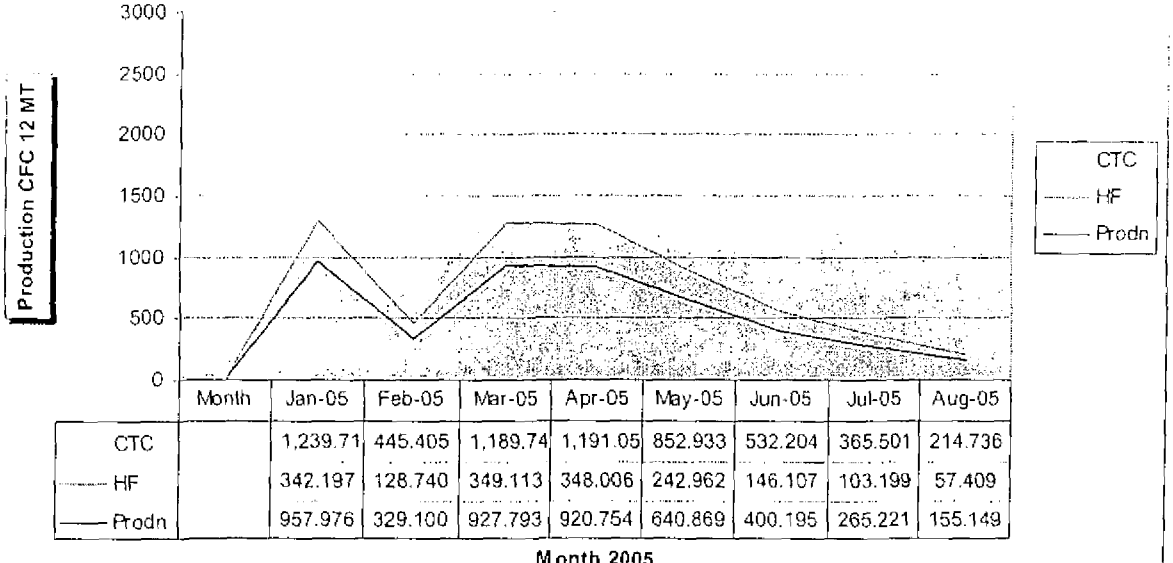
CFC-11



Month	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05
HF	26.606	9.875	27.645	19.841	11.579	10.550	0.854	1.265
CTC	192.813	68.345	188.465	135.838	81.316	76.876	6.070	9.488
Prodn	169.272	57.371	166.972	119.302	69.414	65.675	5.004	7.79

Month 2005

CFC-12



Month	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05
CTC	1,239.71	445.405	1,189.74	1,191.05	852.933	532.204	365.501	214.736
HF	342.197	128.740	349.113	348.006	242.962	146.107	103.199	57.409
Prodn	957.976	329.100	927.793	920.754	640.869	400.195	265.221	155.149

Month 2005

Attachment I

a. Check list of the audit process with the Guideline

	Verification steps	Check by Ess Jay Consultants	Ess Jay Consultants observation
1	Confirm production and raw material consumption from production logs	Done	Production logs and financial records (purchase account, import licence etc.)
2	Verify sales and procurement of ODS products against financial records	Done	Sample verification done with the sales accounts, VAT return, Import of raw materials
3	Verify stock at the beginning and the end of year against financial records	Done	Found satisfactory and also confirmed the same with the audited balance sheet.

b. Steps included in the audit

	Verification steps	Check by Ess Jay Consultants	Ess Jay Consultants observation
1	Review system of record for adequacy	Done	Daily, Monthly record keeping is satisfactory
2	Observe plant condition and apparent operational status	Done	Well maintained plant
3	Audit daily production records and key feedstock consumption data	Done	Daily production logs verified to check process parameters and corresponding quality reports
4	Confirm monthly and annual production Production = sales - change in inventory	Done	Matches
5	Confirm cumulative inventory change of ODS product corresponds to annual production	Done	Checked and found correct as per above report
6	Confirm cumulative inventory change of key raw material is consistent with production both overall and per campaign	Done	Very Consistent
7	Integrate hourly in-plant flow rate data over time to get an independent value for production	Done	Flow rate data compared with the daily production and found OK

8	Compare the changes in reported feed and product tank levels, integrated with the appropriate correction factor to report raw material usage and CFC production	Done	Raw material consumption accounting is on monthly basis.
9	On a spot basis, rationalize hourly plant logs with raw material consumption and production.	Done	System not in place
10	Review logs for periods of high hourly throughput and compare to reported production. Investigate any possible inconsistency	Done	Found consistent
11	Review hourly plant logs during non-campaign time periods to verify non-production	Done	Found consistent
12	Monthly VAT returns made by plant were audited	Done	Found satisfactory, through monthly VAT returns sales, (domestic & exports) & purchase checked against book of account.
13	Report closure activity plans and ascertain measures to be taken by the plant to sustain closure	Done	Obtained letter from Mexico Government that CTC import licence will not be issued to the Company. Plant has given written confirmation that they will not produce CFCs and will dispose the stock of CTC available with them. Proposed equipment changes/dismantling has been obtained and is a part of this report.

c. <u>Steps taken in addition to the requirements of the Guideline</u>

14	Sampling for analysis, CFCs & HCFC-22	Done	Purity, Product verification, satisfactory