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**PROJECT COMPLETION REPORT**

**SECTION 1: PROJECT DATA**

1.1	Country:	Mexico
1.2	Project number: (as per inventory)	MEX/REF/23/INV/74 (MP/MEX/97/177)
1.3	Project title:	Phasing out CFC-11 and CFC-12 at Vendo S.A.
1.4	Date of approval of the project:	23th ExCom Meeting in Nov 1997
1.5	Percentage of national ownership:	100% private company
1.6	Implementing agency:	UNIDO
1.7	Local executing agency/ Financial intermediary:	N.A.
1.8	National coordinating Agency:	Instituto Nacional de Ecologia
1.9	Scheduled date of completion:	September 1998
1.10	Actual date of completion:	December 1998
1.11	Date of project completion report:	October 1999
1.12	Completion report done by: (Implementing agency/National agency)	UNIDO

Prepared by: R. Serpa  
Revised by: E. Puerto-Ferre

Date: October 1999  
Date: October 1999

**SECTION 2: EXECUTIVE SUMMARY**

Item	Plan/ Approved	Actual	National Sector Impact*	Comment
ODS phase-out (in ODP tonnes)	16.5	16.5	3.68% National 9% CFC-11 24% CFC-12	
Budget and expenditure (US\$)	248,524	248,524	N/A	
Cost-effectiveness (in US\$/kg)	15.09	15.09	N/A	
Project Implementation: (in months)	10	10	N/A	
Project duration	10	10	N/A	
Start up of project activities at country level as stated by Article 5 Party concerned	December 97	December 11, 1997	N/A	
Grant agreement submitted to beneficiary	-	May 13, 1998	N/A	
Grant agreement signature	-	May 13, 1998	N/A	
Inspection of new and modified equipment	May 98	May 13, 1998	N/A	
Funds transferred	August 98	February 99	N/A	
Submission of completion report	October 98	May 99	N/A	

\* Expressed in percentage of National/Sector consumption.

**Note:**

As this is a retroactive payment project, main activities in the project were devoted to checking and verification the equipment purchased by the company, as well as the invoices of the suppliers.

Overall Assessment of the Project: *A brief description of no more than 300 words of the degree to which the project achieved its objective(s), major problems encountered and lessons learned.*

The project has been initiated and prepared in 1997 based on the Mexican Country Programme for the phase out of ozone depleting substances. The objective of this project was apply the criteria established at the 22nd meeting of the ExCom, referent to the retroactive funds.

Following approval by the Ex Com the project was carried out in four stages:

1. Inspection of the activities undertaken by the company and the new and modified equipment.
2. Inspection and verification of the invoices.
3. Verification of the booking of entries (Recording of transactions)
4. Transfer of the retroactive funds for equipment and incremental operating costs.

Among the technological options presently available the counterpart chose to replace CFC-12 by HFC-134a. As for the replacement of CFC-11 as a blowing agent for polyurethane foam, the company decided to select HFC-141b.

The company had replaced the following machinery and equipment:

2 automatic production evacuation and charging boards have been replaced by boards suitable for HFC-134a;

2 existing production leak detectors were replaced by 2 special leak detectors for HFC-134a;

The old vacuum pumps were replaced by 4 new Galileo and 3 new Leybold vacuum pumps;

The performance test and cooling circuits redesign were carried out for each model.

Therefore, new performance testing equipment and materials were provided.

*One high-pressure foaming machines (Perros) was purchased in 1992 and is working at present with HFC-141b. One low pressure (Gusmer) foaming machine was purchased and installed in 1996 and is working with HFC-141b.*

## SECTION 3(A): ODS PHASE OUT

### Pre-Conversion

#### 3.1 Main lines of products manufactured:

Production of refrigerators units. (Display cabinets, upright freezers, refrigerators)

#### 3.2 Annual production level:

38.97 MT average (26.18 tons CFC-11 and 12.78 CFC-12) were used in 1,994 to manufacture 38,193 units.

13.3 MT average (0 tons CFC-11 and 13.3 CFC-12) were used in 1,995 to manufacture 39,722 units.

0 MT average were used in 1,996 to manufacture 40,481 units.

#### 3.3 ODS Consumed: Average years 1,994 -1,996

ODS (1):	<b>CFC-11</b>	Quantity (ODP tonnes):	<b>8.73 MT</b>
ODS (2):	<b>CFC-12</b>	Quantity (ODP tonnes):	<b>8.70 MT</b>
Total:	<b>average</b>	Quantity (ODP tonnes):	<b>17.43 MT</b>
National/Sector Impact:			<b>3.69%</b>

### Post-Conversion

3.4 Year of project commissioned: 1,994 and 1,995. Retroactive funding.

3.5 Year of commencement of new production: 1,996

3.6 The transition of ODS-based to non-ODS-based production

Year	Units Produced with ODSs	ODSs Consumed (ODP tonnes)	Units Produced with Substitutes	Substitutes Consumed (tonnes)
1994	38,193 units	38,97 MT	-	-
1995	39,722 units	13,4 MT	-	-
1996	0 units	0 MT	40,481 units	17,8 MT
1997*	0 units	0 MT	52,625 units	23,0 MT
Total	77,915 units	52,37 MT	93,106 units	40,8 MT

\* Year of project approval

3.7 If there is a variance between the ODS phase-out target in the project document and the actual ODS phase-out, please explain.

N.A.

**SECTION 4: TECHNOLOGY CHOICE**

ITEM	PRE-CONVERSION	POST-CONVERSION
<b>4.1 <u>Technology Choice</u></b> Technology employed Environmental impact Determining factor for choice Technology change after approval and reason for change	CFC-11& CFC-12 ODP = 1 The company chose to replace CFC-12 by HFC-134a and decided to select HFC-141b as an intermediate substitute for CFC-11 N.A.	HFC-141b & HFC-134a ODP = 0.11 & 0.00 The choice was suitable N.A.
<b>4.2 <u>Availability</u></b> No. of months spent in acquiring the technology Reason for delay (if any)	Commercially available N.A. N.A.	Commercially available N.A. N.A.
<b>4.3 <u>Safety</u> (where applicable)</b> Main safety hazard Standard applied Certification by*		International standards were applied. Instituto Nacional de Ecologia

\* *Please attach copies of certification*

4.4 Is there any problem encountered in the implementation of the replacement technology? If yes, please elaborate briefly.

N.A.

## SECTION 5: BUDGET AND EXPENDITURES

This is a status report on project expenditures at the time of preparing the project completion report with the understanding that a full financial completion report will be prepared as a supplement once the accounts of the project are closed.

### 5.1 Summary

ITEM	PLAN/APPROVED (US\$)	EXPENDITURE (TO-DATE) (US\$)	DIFFERENCE/ COMMENT (US\$)
Incremental capital cost	37,000	37,000	0
Incremental operating cost	211,524	211,524	0
Contingency cost	0	0	0
Total	248,524	248,524	0
ODS phase-out (kg/ODP)	16,500	16,500	
Cost-effectiveness (\$/kg.)	15.09	15.09	

### 5.2 Budget and Expenditure on Incremental Capital Cost

ITEM*	APPROVED	EXPENDITURE	DIFFERENCE	REASON
General consultancy services & technology transfer	0	0	0	
Equipment	37,000	37,000	0	
Contingencies	0	0	0	
Incremental operating cost, two years	211,524	211,524	0	
<b>Total Investment</b>	248,524	248,524	0	Retroactive Payment

\*List of equipment approved in the project document (additional equipment should be so indicated).

5.3 Budget and Expenditure on Incremental Operating Cost

<b>CFC-11 PHASE OUT</b>						
Production using CFC				Production using HFC-141b		
	%	Price US\$/kg	Cost US\$/kg	%	Price US\$/kg	Cost US\$/kg
Polyol	37	2.25	0.8325	38	2.25	0.855
MDI	49	3.1	1.519	56	3.1	1.736
ABA	14	4.2	0.588	6	5.5	0.33
<b>Total</b>	<b>100</b>	<b>\$/kg</b>	<b>2.940</b>	<b>100</b>	<b>\$/kg</b>	<b>2.291</b>
kg of foam per unit			8.55	9.41		
Total cost US\$/unit			25.13	27.47		
Incremental cost difference US\$			2.34	per unit		
<b>CFC-12 PHASE OUT</b>						
				kg	US\$/kg	Total
Average charge CFC-12				0.33	4.40	1.47
HFC-134 a charge				0.30	5.30	1.59
Difference					0.12	
Incremental cost difference US\$			0.12	per unit		
Modification				Incremental Cost (US\$)		
HCF-134a compressor					3	
Capillary tube modification					0.2	
Evaporator and condenser modification					0.5	
3 AA drier					0.2	
HFC-134a refrigerant					0.12	
Extra polyurethane foam because oh higher density (+10%)					2.34	
<b>TOTAL</b>					<b>6.36</b>	<b>US\$per unit</b>
<b>INCREMENTAL OPERATING COSTS</b>						
Number of units (average per year during period 94 to 96)					<b>19,255</b>	<b>units</b>
Incremental operating costs one year operation					<b>122,515</b>	<b>US\$</b>
Coefficient for N.P.V.					1.74	
<b>Incremental operating costs two years operation</b>					<b>213,176</b>	<b>US\$</b>

5.4 Budget and Expenditure on Contingency Cost

CONTINGENCY FUNDS	ITEM(s)	EXPENDITURE
	Total	0
	Approved	0
	Difference	0



**SECTION 6: IMPLEMENTATION EFFICIENCY**

ITEM	AS PLANNED		DELAY/COMMENT
	YES	NO	
<b>6.1 Project Schedule</b>	X		
Project duration	X		
Start of project activities at country level as stated by Article 5 Party concerned	X		
Grant agreement submitted to beneficiary	X		
Grant agreement signature	X		
Inspection of new and modified equipment	X		
Funds transferred		X	
Submission of completion report	X		

6.4 Please describe any major problems encountered in project implementation and what was the major cause of delay.

No delays in project implement.

## SECTION 7: DISPOSAL OF ODS-BASED PRODUCTION EQUIPMENT

### 7.1 List of equipment rendered unusable

LIST OF EQUIPMENT RENDERED UNUSABLE (The Baseline)*		DISPOSAL IMPLEMENTED			
Name of Equipment	Description **	Method of Disposal	Date of Disposal	Implementer	Certified By
N.A.	N.A.	-	-	-	-

\* *List of equipment rendered unusable in the project document*

\*\* *Description should include Model No. And Serial No.*

### 7.2 Describe briefly the process of destruction and attach copies of certification of destruction.

## SECTION 8: OVERALL ASSESSMENT OF PROJECT

Using three quantifiable indicators, namely ODS phase-out (plan v. actual) cost and speed of completion (plan v. actual), give an overall assessment of the project in the scale below.

- { } Highly satisfactory, more than planned
- {X} Satisfactory, as planned
- { } Satisfactory, though not as planned
- { } Unsatisfactory, less than planned
- { } Unacceptable

Comments from Government:

## SECTION 9: LESSONS LEARNT

State any lessons that can be drawn from this project that will benefit future projects.

Verification of equipment invoices and the recording of transactions in company's books is a very consuming time task. A lot of attention has to be paid in order to avoid mistakes. Excellent cooperation from the company's side is requested.