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PROJECT PROPOSAL: COLOMBIA

This document includes the following project proposal:

- Implementation of a national programme for recovery and recycling of refrigerant UNDP

PROJECT COVER SHEET

COUNTRY: COLOMBIA

PROJECT TITLE: Implementation of a national program for recovery and recycling of refrigerant.

SECTOR COVERED: Refrigeration and air-conditioning maintenance sector

ODS USE IN SECTOR: 1071 Tons/year of CFC-12 in 1994
PROJECT IMPACT: 111.4 Tons/Year of CFC-12

PROJECT DURATION: 1 Year
ECONOMIC LIFE: 5 Years

TOTAL COST: 886,000 US\$
PROPOSED MLF GRANT: 886,000 US\$

COST-BENEFIT RATIO
PHASEOUT: 2.1 US\$/Kg

COORDINATING NATIONAL: MINISTERIO DE MEDIO AMBIENTE
BODY:

IMPLEMENTING AGENCY: UNDP

PROJECT SUMMARY.

The project is to implement a comprehensive National Program for Recovery/Recycling of refrigerant in the refrigeration and air-conditioning sectors except, for mobile air-conditioning. To launch the Recovery/Recycling project, 10 Presentation Workshops, for technicians performing repairs, maintenance and installation of refrigeration and air-conditioning equipment, will be held to familiarize all involved with the recovery/recycling project and explain the different methods for recovery of refrigerants with or without the equipment that will be supplied. The Workshops will also emphasize the need for good practice in the handling of refrigerants during servicing and installation.

The Project will provide recovery and recycling equipment and a Nation-wide Recycling Network for the recovered refrigerant will be established. A system for monitoring the quantity and quality of the CFC 12 recycled (with periodic evaluation) is planned to ensure the success of the Recovery/Recycling Program. This task will be carried out by the Ministerio de Medio Ambiente (Ministry of Environment).

Project prepared by Mr. Robert Berkeley, UNDP Recovery-Recycling Consultant

PROJECT FOR THE GOVERNMENT OF COLOMBIA

IMPLEMENTATION OF A NATIONAL PROGRAM FOR RECOVERY AND RECYCLING OF CFC REFRIGERANT

1. PROJECT OBJECTIVES

The objective of the project is to implement a comprehensive National Program for Recovery/Recycling of CFC-12 refrigerant in the refrigeration and air-conditioning (R + A/C) sectors.

2. SECTOR BACKGROUND

Colombia's Country Program for the reduction of Ozone Depleting Substances (ODS) was approved in March 1994 and the 1995 Update shows that 84.67% of ODS are in the R + A/C sector. Total imports of CFC 12 during 1994 were 1664 tons of which it is estimated that 1071 tons (64.4%) are used for maintenance of existing R + A/C equipment. As the CFC is not consumed by the process of refrigeration the amount used in maintenance must be considered to be to replace that which is lost to the atmosphere. Losses of CFC charge in installations can be attributed to leaks and purposeful venting during servicing activities. The other principle emissions of CFC in the R + A/C maintenance sector are caused when refrigeration units or systems are emptied to permit their conversions to non ODS refrigerants or during their dismantlement and destruction at the end of their useful life..

This project is part of an overall strategy by the Government of Colombia for the refrigeration sector. The first priority is to stop the discharge of CFC's into the atmosphere due to leaks and servicing emissions in the refrigeration and air-conditioning sectors. In order to achieve this, the Government is considering a proposal to control the purposeful emitting of CFC and in consequence has decided to launch the comprehensive Recovery/Recycling Program presented herewith. A Training Program on Good Practices in Refrigeration will also be initiated, implemented by UNEP. These two Programs are complementary and though necessarily independent will attempt to coordinate in their implementation.

In accordance with the provisions of the Copenhagen Amendment, CFC production will cease by the end of 1995 in the developed countries. This will affect its availability and price in the International Market and will directly affect consumers in the country, especially the R + A/C service sectors, the major user of CFC in Colombia, which must import all of its CFC,

Indirectly this project will allow Colombia to continue to use its present refrigeration and air-conditioning installations for a further period of time without conversion, as recovered CFC will be available in the coming years. This should allow the country to face the most

immediate consequences of possible future shortages of CFC on the international markets.

3. PROJECT JUSTIFICATION

One of the highest priorities in the phaseout of the use of CFC in the refrigeration sector is to improve maintenance practices of technicians, repairing and servicing existing CFC installations and the recovery and storage of the refrigerant present in the installation while conducting repairs and servicing to avoid unnecessary losses and venting of CFC. This project will disseminate this type of information.

The Recovery/Recycling Project constitutes a National Program which aims at phasing out CFC for the domestic and commercial refrigeration sectors, as well as the air-conditioning sector, and will result in a phaseout of 111.4 tons of CFC per year. To ensure its success, the government will introduce a comprehensive monitoring system to check on a periodic basis how much CFC are being recycled by each of the recovery equipment provided through this project and assure its quality.

The quantity of CFC 12 that will not have to be imported anymore, thanks to the recovery/recycling efforts of this project, is estimated as follows:

- 1) 330 recovery machines will recover an average of 1.5 Kg of refrigerant per day per machine.
- 2) There are 250 working days per year.
- 3) 90% of the recovered material can be recycled.

Annual recycled CFC 12 would amount to 111.4 Tons.

It should be noted that this figure does not include the amounts of CFC that might be recovered with or without equipment by technicians excluded from the project but which will be accepted for recycling by the center created by the project. Nor does it include the amounts of CFC that would be expected to be saved by the better servicing practices emphasized during the workshops (recovery to allow leaks to be repaired, etc.).

4. PROJECT ACTIVITIES AND PROJECT COSTS.

4.1 ACTIVITY 1: DEMONSTRATION SEMINARS ON RECOVER/RECYCLING PROGRAMS AND GOOD MAINTENANCE PRACTICES.

10 Demonstration Workshops will be held. Each Workshop will be of one day duration and will include an explanation of the need for recovery and recycling, the presentation of recovery and recycling technologies and methodologies in different systems as well as good practice during servicing and maintenance.

It should also be noted that the Workshops will utilize (among other materials) some of the existing training documentation and material such as that prepared for previous Workshops as well as other material prepared by UNEP.

	US\$
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International consultant/lecturer	15,000
Logistical arrangements for workshop (10)	30,000
Duplication of technical literature	3,000
=====	
TOTAL	48,000

4.2 ACTIVITY 2: RECOVERY AND RECYCLING PROGRAM

Creation of a National Recovery-Recycling Network.

Based on the present needs of Colombia, the Government has decided to establish the Network by supplying 330 refrigeration and air-conditioning maintenance centers with the necessary equipment for the recovery of CFC-12 and 14 recycling centers to treat the recovered refrigerant. The Recycling Centers will be located in the following cities:

- | | |
|----------------|----------------|
| 1. Baranquilla | 8. Ibague |
| 2. Bogota 1 | 9. Medellin 1 |
| 3. Bogota 2 | 10. Medellin 2 |
| 4. Bucaramanga | 11. Monteria |
| 5. Cali 1 | 12. Pasto |
| 6. Cali 2 | 13. Pereira |
| 7. Cartagena | 14. Valledupar |

The Recycling Centers will also be made available for the treatment of CFC-12 recovered by Colombian based companies or maintenance centers, not directly included in the Recovery Network.

The equipment needed for the Recovery and Recycling Network includes the following items.

US\$

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CFC 12 EQUIPMENT TO BE USED BY 70 MAINTENANCE CENTERS

- 330 Recovery machines (see notes)	330,000
- 730 ERC Refrigerant recovery cylinders with two ports and OFP switch	73,000
- 330 Recovery equipment kits (see notes)	118,000
- 400 Recovery bags	88,000

CFC 12 EQUIPMENT TO BE USED AT RECYCLING CENTERS

- 14 Recycling Machines	42,000
- 14 Refrigerant identification kits (see notes)	8,000
- 70 100 Lb Cylinders with OFP switch	23,000

MAINTENANCE AND SPARES 25,000

FREIGHT COSTS 40,000

CONTINGENCIES (10% OF THE ABOVE) 75,000

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TOTAL 822,000

NOTES:

1. Each recovery machine will include a DOT recovery cylinder to act as a buffer tank. This buffer tank is necessary to increase the recovery rate of medium weight and therefore acceptably portable equipment.

2. Of the 730 recovery cylinders, 660 (2 each) will be distributed among the 330 Recovery Centers. The remaining 70 (5 each) will be expected to be held in reserve at the Recycling Centers for use when large Refrigeration or A/C systems are serviced or retrofitted.

3. The Recovery Equipment Kits are necessary for a correct and safe usage of the recovery machines. Each kit will include a gauge manifold with hoses, a leak detector, 2 service couplings, a set of service hoses, a thermometer, a weighing scale, piercing pliers, goggles and gloves.

4. The 400 Refrigerant Recovery Bags are to be used for recovery of CFC from domestic refrigeration.

5. The Refrigeration Identification Kit is of utmost importance to define the degree of contamination in the recovered refrigerant and to avoid the attempted recycling of mixed refrigerants.

6. Samples will be taken of the recycled refrigerant and the samples will be analyzed for cleanliness under the supervision of the Coordinating Unit, which is the Ministerio de Medio Ambiente. The Ministerio de Medio Ambiente will also be responsible for monitoring the amount of CFC recycled.

7. The recycled CFC will be returned, as such, to the Recovery Network at a price that shall be not more than that which will reasonable cover the running costs of the Recycling Center without causing a profit for the operation. This price will be supervised by the Ministerio de Medio Ambiente. The Recycling Centers will be situated within the installations of the principle refrigerant suppliers, who will also be responsible for the running of the centers. Each of these refrigerant suppliers will be invited to submit their proposals and qualifications to the Ministerio de Medio Ambiente, who will have the responsibility for deciding the correct sites.

8. The sites chosen for each Recycling Center will necessarily include protected but properly ventilated areas for the placing of the recycling equipment and for the storage of the recovered and recycled refrigerant. The chosen operators will be supplied with refrigerant containers for the storage of the recycled CFC but, will be expected to possess adequate equipment for transferring the recycled refrigerant to portable cylinders as well as cylinders to secure storage for the CFC unacceptable for recycling. The Ministerio de Medio Ambiente will agree a reasonable monthly remuneration for these facilities and they will be included within the running costs, as will the recycling machine's replacement filters.

9. The technicians responsible for the operation of the Recovery Centers must have recognized experience in handling refrigerant.

4.3. ACTIVITY 3: MONITORING SYSTEM.

As already mentioned in notes 6 through 9 of the previous paragraph, Medio Ambiente will play a key role to ensure a proper follow-up and monitoring of the recovery/recycling activities. To assist Medio Ambiente to keep record of the amount presented for recycling by each service center, it is necessary to recruit a National Consultant.

During the first month, this consultant would have to set up a computer database to monitor the information received from the service centers. He would then work half-time during that period. For a remaining period 11 months of the project, 4 hours per week to keep the data up to date and produce monthly reports should be sufficient.

	US\$
=====	
1 National Consultant	
first month	4,000
remaining eleven months	9,000
1 computer and software	3,000
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Total	16,000

4.4. TOTAL CAPITAL COSTS.

The three activities mentioned above amount to US\$ 886,000

5. EXPECTED PROJECT RESULTS.

- Reduction of 111.4 tons/year of CFC purchased is expected.
- Improved training of technicians in the refrigerant/air-conditioning sector.
- Encouragement for companies maintaining their own systems or equipment but not directly included in this Project (i.e. Beverage manufacturers) to recover CFC 12 during servicing.

6. TIMETABLE

TASK	TIME FOR COMPLETION					
	Q1	Q2	Q3	Q4	Q5	Q6
1. PREPARATION MLF Approval Procurement preparation Arrival of equipment	XX XX	XXX X				
2. DEMONSTRATION SEMINARS			XX			
3. STARTING RECOVERY/RECYCLE distribution of equipment			XX	XXX		
4. MONITORING SYSTEM				XXX		

7. COORDINATING NATIONAL BODY

The Ministerio de Medio Ambiente will coordinate the implementation of this project, manage the monitoring system and assure the quality of the recycled refrigerant.

8. PROJECT COSTS

All capital costs were spelled out in paragraph 4 and their total amount equals 886,000 US\$.

All recurrent costs will be covered by the charge levied as the sale-back price of the recycled refrigerant.

The project will be monitored by the coordinating nation body to assure that the sale-back price is balanced and neither incurs financial profit nor loss to the operator.

The unit abatement cost is calculated as follows:

a) Incremental capital cost	886,000 US\$
b) Project economic life	5 Years
c) incremental recurrent cost	nil
d) CFC consumption	111.4 Tons/year
e) Capital recovery factor (5 years)	0,2638
=====	
Unit abatement cost (a x e + c)/ d =	2.1 US\$/Kg

9. PROJECT REVIEW AND REPORTING

The project will be the object of tripartite review (consisting of representatives from the Government, the Executing Agency and the UNDP) for at least one time every 12 months. The National Coordinator of the Project or the official responsible for the execution of the Project will prepare and submit for each of these tripartite review meeting a progress and evaluation report. During project implementation, other reports of this kind may be requested if needed.

A final project report will be prepared to be considered at the final tripartite meeting of the project. A draft of this final report will be prepared in advance so that all parties may examine its contents before the final tripartite meeting. The final draft will be obtained after this meeting, to incorporate final observations (technical and others).