



United Nations Environment Programme



Distr.
LIMITED



UNEP/OzL.Pro/ExCom/12/28
25 February 1994

ORIGINAL: ENGLISH

Executive Committee of
the Multilateral Fund for the
Implementation of the Montreal Protocol

Twelfth Meeting
Montreal, 28-30 March 1994

PROJECT PROPOSALS: PHILIPPINES

This document includes the following project proposals and the Fund Secretariat's Comments and Recommendations:

1. Elimination of the residual use of CFCs in the manufacture of extruded polystyrene foam sheet in the Philippines (3 companies);
2. Technical Assistance Program for the Elimination of CFC-use at Small Manufacturers of Flexible Foam.

PROJECT EVALUATION SHEET

COUNTRY OR REGION:	Philippines
PROJECT TITLE:	Elimination of the residual use of CFCs in the manufacture of extruded polystyrene foam sheet in the Philippines (3 companies)
BUDGET:	US \$522,400 Capital Cost US \$17,400 Operational Benefits
INCREMENTAL COSTS:	US \$505,000
ODS PHASE-OUT:	24 Tonnes CFC-12/year
COST EFFECTIVENESS:	US \$21.0 per Kg. ODP saved
PROJECT DURATION:	One year
IMPLEMENTING AGENCY:	UNDP
NATIONAL COORDINATING AGENCY :	Department of Environment and Natural Resources (DENR)
TECHNICAL REVIEW COMPLETED:	YES <u> X </u> NO <u> </u>

SECRETARIAT'S COMMENTS

1. The objectives of this project are to phase out the use of 24 tonnes of CFC-12 at Concept Packaging Co. through conversion to butane-based technology and establish safe production conditions in two companies that have already converted to hydrocarbons, but not under application of internationally accepted safety standards.
2. Capital costs related to the equipment modification for Concept Packaging Co. and safety-related measures of US \$85,500 for each of the three companies (including Concept Packaging) are US \$522,400.
3. Operational savings are calculated at US \$17,400 for Concept Packaging for four years, using 10 per cent discount rate.
4. The project has been reviewed and supported by UNDP's sector expert on the Foams Technical Review Panel.

SECRETARIAT'S RECOMMENDATION

1. The Secretariat recommends final approval in the amount requested, i.e. US \$505,000.

PROJECT EVALUATION SHEET

COUNTRY OR REGION: Philippines

PROJECT TITLE: Technical Assistance Program for the Elimination of CFC-use at Small Manufacturers of Flexible Foam

BUDGET: US \$745,000

INCREMENTAL COSTS: US \$745,000

ODS PHASE-OUT: 35T CFC-11/year

COST EFFECTIVENESS: US \$21.3 per Kg. ODP saved

PROJECT DURATION: One year

IMPLEMENTING AGENCY: UNDP

NATIONAL COORDINATING AGENCY : Department of Environment and Natural Resources (DENR)

TECHNICAL REVIEW COMPLETED: YES X NO

SECRETARIAT'S COMMENTS

1. This project is identical to one which was approved at the 11th Meeting of the Executive Committee (Technical Assistance Programme for small CFC Users in the Flexible Polyurethane Foam Sector - Indonesia) and one which is submitted at the 12th Meeting by Malaysia.
2. This is a two-phase project to identify users and their assistance needs in the first phase and to convert about 20 small users from CFC-11 to methylene chloride in the second phase. This project includes three training programmes, funds for international and local foam expert technical assistance, and investment costs.
3. The primary cost is US \$600,000 for safety measures associated with the use of methylene chloride for the 20 small user conversions anticipated for the second phase of the project.
4. The technical reviewer suggested that training materials of Indonesia could be used with some modifications to local circumstances, local experts could be used more frequently if international experts could thoroughly train them, and international experts' travel could be minimized if three countries' projects are well coordinated.

SECRETARIAT'S RECOMMENDATION

1. The Secretariat recommends final approval in the amount requested, i.e., US \$745,000, and recommends that the technical reviewer's suggestions should be considered during the project implementation.

PROJECT COVER SHEET

COUNTRY: Philippines

PROJECT TITLE: Elimination of the residual use of CFCs in the manufacture of extruded polystyrene foam sheet in the Philippines (3 companies)

SECTOR COVERED: Foamed Plastics

ODS USE IN SECTOR: 417t CFCs (417t ODP) in 1991

PROJECT IMPACT: 24 TONS CFC-12/y

PROJECT DURATION: One year

TOTAL PROJECT COSTS: USD 522,400 Capital Cost
USD 17,400 Operational Benefits

PROPOSED MLF GRANT; USD 505,000

COST EFFECTIVENESS: USD 3.20/kg/y (unit abatement cost)

NATIONAL COORDINATING BODY: Department of Environment and Natural Resources (DENR)

IMPLEMENTING AGENCY: UNDP

APPRAISAL DATE: January 10/February 8, 1994

PROJECT SUMMARY

This project will eliminate the residual use of CFCs in the extruded polystyrene foam sheet (XPS) industry in the Philippines and establish safe production conditions in the plants that have already converted to non ODS technologies--after the Philippines signed the Montreal Protocol--but not under application of internationally acceptable safety standards. The project will be implemented in close cooperation with the "Polystyrene Packaging Council of the Philippines", an organization that is very active on behalf of its members in the area of environmental matters.

TECHNICAL ASSESSMENT

The project has been reviewed and approved by Jerry S. Pool from UNDP's Technical Review Panel. His comments are attached.

PROJECT OF THE GOVERNMENT OF THE PHILIPPINES
ELIMINATION OF THE RESIDUAL USE OF CFCs IN THE MANUFACTURE
OF EXTRUDED POLYSTYRENE FOAM SHEET
IN THE PHILIPPINES

1. PROJECT OBJECTIVE

The objective of this project is (i) to phase out the residual use of CFCs in the manufacture of XPS foam sheet in the Philippines and (ii) to establish safe workplace conditions in plants that converted already to non-ODS technologies but are insufficient, protected against the related fire risks.

2. SECTOR BACKGROUND

The CFC consumption in the foam sector in the Philippines is estimated to have reached about 420t in 1991 (ref.: Table 1). CFC-11 (polyurethane foams) and CFC-12 (polystyrene foam sheet) are the dominant substances in this sector.

CATEGORY	CFC-11	CFC-12
Polyurethane Foams (PUF)		
Flexible PUF	25	
Rigid PUF Appliances	285	
General Insulation	90	
Extruded Polystyrene Foams		17
TOTAL	395	17

Table-1: CFC-Use in the Foam Industry in the Philippines
(1991; metric tons)

The Government intends to eliminate the use of CFCs in this sector in or before 1998 through awareness programs, regulations and incentives. A specific ban on the use of CFCs in the manufacture of flexible foams is scheduled for 1994.

3. BACKGROUND OF THE XPS INDUSTRY IN THE PHILIPPINES

There are four companies in the Philippines that manufacture XPS foam sheet (ref.: table-2). Company profiles are provided in annex-A.

COMPANY	BLOWING AGENT	
	TYPE	AMOUNT
Concept Packaging Corp.	CFC-12	24t
Amtes Corp.	Butane	60t
Q.C. Styropackaging Corp.	LPG	40t
PSP Group	Butane	25t ¹

Table-2: XPS manufacturers in the Philippines
and expected blowing agent use in 1994

Three of the four companies have already phased-out the use of CFCs in their products. Concept has initially shifted to HCFC-22 but was not successful in this conversion.

The industry is represented through the "Polystyrene Packaging Council of the Philippines, Inc.", consisting of 14 members covering XPS, EPS, PS-extrusion and resin manufacturing/distribution. The council is very active in planning of post-consumer recycling, safety, etc.

4. PROJECT DESCRIPTION

This project will eliminate the residual use of CFCs in the Filipino XPS industry and bring the plants that have already converted, up to internationally accepted safety standards.

"Concept" will under this project convert to the use of butane. The project will include related safety measures.

"Amtes" and "Q.C." will implement the installation of safety

¹ estimate

related equipment and safety training.

The foreign owned PSP Group is not eligible for support under the MLF but will be invited to attend safety seminars, to review the safety recommendations under this project and to implement any recommended modifications on their own.

An international process expert will oversee the implementation of the project, provide technology transfer, safety manuals and perform safety training.

5. TECHNOLOGY

5.1 OVERVIEW AND SELECTION

There are several options to replace CFCs in the production of XPS foam sheet, such as:

- o Atmospheric gases (Nitrogen, Carbon Dioxide),
- o Hydrocarbons (LPG, butanes, pentanes),
- o HCFCs (-22; -142b),
- o HFCs (-134a; -152a),

Summaries of these technologies, their potentials and their limitations are provided through the UNEP Technical Options Committee's bi-annual review and through several review papers from UNDP.

Hydrocarbons, specifically LPG and butane are selected by the Filipino companies as alternatives that are:

- o Proven technology in processing and product performance,
- o Environmentally acceptable,
- o Low in toxicity,
- o Adaptable to existing equipment,
- o Cost effective,
- o Available in the local market.

A draw back of hydrocarbons is the high flammability, requiring extensive safety precautions.

Users of hydrocarbons are subject to stringent fire regulations. The emission of hydrocarbons is not regulated in the Philippines, nor are restrictions expected in the foreseeable future.

5.2 PRODUCTION PROCESS

The use of hydrocarbons will require substantial changes in the production process and storage facilities. Required equipment modifications and additions may include:

- o **Storage**
 - o Separate, explosion proof, location of the butane tank.
- o **Feeding systems**
 - o Injection systems for additives (anti-diffusion and anti-static agents),
 - o Replacement of the foamant metering pump and injection system,
 - o New gaskets and seals.
 - o New pressure gauges
- o **Extrusion system**
 - o Replacement or modification of the screw,
 - o Replacement or modification of the extrusion die.
- o **Electrical systems**
 - o Installation of spark arresters,
 - o Sealing of electrical control cabinets,
 - o Explosion proof motors and switches.
- o **Auxiliary safety devices**
 - o A ventilation system to prevent the accumulation of hydrocarbon vapors,
 - o Monitoring and alarm systems for hydrocarbon vapors,
 - o Extra fire extinguishers.

Production and aging areas are to be separated from other working areas and to be sprinklered or otherwise protected against fire hazards.

Production and maintenance personnel has to be trained in the safe handling of hydrocarbons, in addition to production training.

Start-up trials will be necessary to adjust for foamant volume and permeability.

6. PROJECT COSTS

6.1 Capital Costs

The following is a summary of the expected costs of investment and related activities. The costs are based on information from a

recently completed project in Malaysia (equipment modifications, safety systems), from local suppliers (tank) and from an international process expert (safety design, training, technology transfer). Annex-1 provides more details.

DESCRIPTION	SUBTOTAL	TOTAL
CONCEPT PACKAGING CORP.		
o Moving of the Equipment		20,000
o Storage Tanks		70,000
Purchase	20,000	
Testing	2,000	
Installation	48,000	
o Equipment Modification		80,000
Parts	70,000	
Installation	10,000	
o Fire Safety Systems		76,300
o Technology Transfer		20,000
SUB-TOTAL		266,300
AMTES CORP (a.k.a. Foampac)		
o Building modifications		14,000
o Fire Safety and Alarm System		71,500
SUB-TOTAL		85,500
Q.C. STYROPACKAGING CORP.		
o Building modifications		14,000
o Fire Safety and Alarm System		71,500
SUB-TOTAL		85,500
o General costs		
Pre-/Post Audits	10,000	
Safety training	10,000	
Commissioning/ Post -monitoring	15,000	35,000
o Contingency and Rounding		50,100
GRAND TOTAL		522,400

6.2 OPERATING COSTS

Annual operating benefits of USD 5,040 are calculated and specified in annex-C. At 10% discount and over four years of operation this amounts to a net present value (NPV) of

USD 17,400
=====

6.3 UNIT ABATEMENT COST

a)	ODS Reduction Project Costs	USD 522,400
b)	Annual Incremental Benefits	USD 5,040
c)	Project Useful Life	10 years
d)	ODS reduction/y	kg 24,000
f)	Capital Recovery Factor (10% discount).....	0.16275

Unit Abatement Costs [(a/c + b)/d] USD/kg/3.20
=====

7. FINANCING PLAN

The eligible grant is calculated to be:

USD 505,000
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8. PROJECT IMPLEMENTATION

8.1 MANAGEMENT

UNDP will oversee the implementation of this project and provide technical assistance.

8.2 SCHEDULE

Implementation schedule will start with MLF approval of the project and will end after monitoring has confirmed that at no place on the machines or in the working areas unsafe levels of hydrocarbons can be detected.

TASK	TIME FOR COMPLETION					
	Q1	Q2	Q3	Q4	Q5	Q6
1. Preparation MLF Approval Visit Consultant Order Confirmation	x x	x				
2. Installation Arrival, Customs Machine Modifications Tank Installation Safety Devices			x x x x			
3. Start-up, Training Machine Start-up Safety Training Commissioning				x x x		

8.3 PROCUREMENT

UNDP will oversee the procurement. UNDP expects at the about the same time to procure 3-5 similar projects, resulting in procedural and cost efficiencies.

9. PROJECT IMPACT

This project will eliminate the use of at least 24 tons of CFCs in the first year of implementation and ensure safety in plants that have already transferred to non-ODS technology on their own. The project employs commercially and environmentally acceptable technology.

10. ANNEXES

- Annex A: Company Profiles
- Annex B: Detailed project specifications and costs
- Annex C: Incremental Recurrent Cost
- Annex D: Technical Assessment

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01-09-94/02

ANNEX-C

INCREMENTAL RECURRENT COST

ASSUMPTIONS

1. As only "Concept" changes blowing agent, changes in operational costs are assumed and calculated for this company only.
2. The following are the current costs for CFC-12 and its intended replacement, butane (January 1994):
CFC-12 2.36 USD/kg
Butane 0.47 USD/kg
3. The use of hydrocarbons requires addition of an anti-shrinkage and a static-dissipative agent. Costs are assumed at USD 30/ton resin.
4. The company used 8% CFC-12 and plans to use 10% butane.
5. The annual foam production is assumed at 300t/y (1993: 290t).
6. 1US dollar equals 28 Filipino pesos.

INCREMENTAL MATERIAL COST

Before conversion:	
24T CFC-12 @ 2.36.....	USD 56,640
After conversion:	
30t butane @ 0,47.....	USD 14,100
Additives.....	USD 9,000.....USD 23,100
Incremental Material Savings.....	USD 33,540

OTHER INCREMENTAL OPERATING COSTS

o Higher Insurance:	Building USD 10,000	
	Transport USD 5,000.....	USD 15,000
o Higher Maintenance:		
	5% of capital costs.....	USD 13,500
Incremental operating costs.....		USD 28,500

The resulting annual cost savings of USD 5,040 translates in a net present value (4y/10%) of:

USD 17,400
=====

RESOURCE POOL

Consulting In: Environmental and
OSHA Compliance.
Urethanes Process and
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PHILIPPINES EXTRUDED POLYSTYRENE GROUP PROJECT

SCOPE

The project is concerned with the replacement of CFC-12 in the manufacturing of extruded polystyrene foam sheets.

RECOMMENDATION

The project is supported.

RELEVANCY AND ADEQUACY OF INFORMATION

The document provides adequate information.

TECHNICAL SOUNDNESS

The choice of butane is sound. Fire safety is the major issue and it is good that the other companies will be addressing that concern.

LESSON FROM EXPERIENCE

No particular issues to address.

ENVIRONMENTAL ISSUES

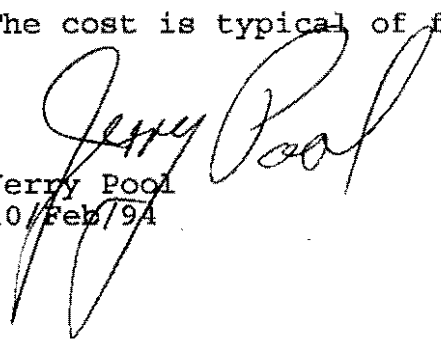
Hydrocarbons are the choice and the VOC component is accepted.

SAFETY ISSUES

Fire and explosion concerns are adequately addressed.

COST EFFECTIVENESS

The cost is typical of fairly low ODP elimination projects.


Jerry Pool
10/Feb/94

PROJECT COVER SHEET

COUNTRY: Philippines

PROJECT TITLE: Technical Assistance Program for the Elimination of CFC-use at Small Manufacturers of Flexible Foam

SECTOR COVERED: Foamed Plastics

ODS USE IN SECTOR: 417t CFCs (417t ODP) in 1991.

PROJECT IMPACT: 35t CFC-11/y (base: 1994)

PROJECT DURATION: One year

PROJECT ECONOMIC LIFE: Ten years

TOTAL PROJECT COST: USD 745,000

PROPOSED MLF GRANT: USD 745,000

COST EFFECTIVENESS: USD 3.49/kg/y (unit abatement cost)

NATIONAL COORDINATING BODY: Department of Environment and Natural Resources (DENR)

IMPLEMENTING AGENCY: UNDP

APPRAISAL DATE: January 11, 1994

PROJECT SUMMARY

This project will phaseout the consumption of CFC-11 at approximately 20 small enterprises producing flexible polyurethane foam in the Philippines. These companies are expected to use about 35t in 1994. The project will be divided in two parts. The first part will constitute a technical assistance program to educate the companies involved. The second part will convert the enterprises to non-ODS technologies. Preferred technology will be the use of methylene chloride, but in individual cases other technologies such as additives and single block vacuum curing units may be used.

TECHNICAL ASSESSMENT

The project has been reviewed and approved by Jerry S. Pool from UNDP's Technical Review Panel. His comments are attached

PROJECT OF THE GOVERNMENT OF THE PHILIPPINES
TECHNICAL ASSISTANCE PROGRAM FOR THE ELIMINATION OF CFC-USE
AT SMALL MANUFACTURERS OF FLEXIBLE FOAM

1. PROJECT OBJECTIVE

The objective of this project is (i) to phaseout the use of CFCs and (ii) to establish safe working conditions for the application of non-ODP technologies at small scale manufacturers of flexible foam in the Philippines.

2. SECTOR BACKGROUND

The CFC consumption in the foam sector in the Philippines is estimated to have reached about 420t in 1991 (ref.: Table 1). CFC-11 (polyurethane foams) and CFC-12 (polystyrene foam sheet) are the dominant substances in this sector.

CATEGORY	CFC-11	CFC-12
Polyurethane Foams (PUF)		
Flexible PUF	25	
Rigid PUF Appliances	285	
General Insulation	90	
Extruded Polystyrene Foams		17
TOTAL	395	17

Table-1: CFC-Use in the Foam Industry in the Philippines
(1991; metric tons)

The Government intends to eliminate the use of CFCs in this sector in or before 1998 through awareness programs, regulations and incentives. A specific ban on the use of CFCs in the manufacture of flexible foams is scheduled for 1994.

3. BACKGROUND OF THE FLEXIBLE FOAM INDUSTRY IN THE PHILIPPINES

There are four identified companies in the Philippines that produce flexible polyurethane foams on an industrial scale, generally through a continuous process. These companies, that produce an estimated 80% of the production in the Philippines, have all - on their own initiative and by their own financial and technical means-- phased out the use of CFCs in view of the scheduled regulatory ban on the use of these substances in the manufacture of flexible foams.

There are an estimated 20 small scale companies that are characterized by lack of chemical and technical sophistication, manual operations, discontinuous foam dispensing equipment and related low financial investment. These companies do not have the chemical, technical--and frequently also not the financial--means to achieve the conversion to non-ODS technology. In itself commendable attempts to replace CFC-11 caused frequently unacceptable process and quality problems as well as hazardous workplace conditions related to chemical exposure and fire hazards. This segment of the flexible foam industry therefore continues to consume CFC-11 (1994 estimate: 35t).

4. PROJECT DESCRIPTION

This project will eliminate the residual use of CFCs in the Filipino Flexible PUF industry by converting the small scale manufacturers to the use of methylene chloride, combined with appropriate measures to assure safe working conditions and the reduction of the inherent fire danger in the lower densities to an acceptable level.

The first part of the project will comprise of:

- o Establishment of **regional support**, such as the appointment of local expert(s), cooperation from chemical and equipment suppliers, government participation, etc;
- o Three **regional training programs** to instruct the individual companies in the practical use of non-ODS technologies;
- o An **audit program** to define individual process and workplace conditions;
- o Preparation of an **action program** to achieve individually elimination of the use of CFC-11.

The second part of the project will comprise of:

- o Purchase and installation of any **equipment** deemed necessary and the acquisition of **chemicals** for trials;
- o **Individual plant visits** to inspect the modifications and to provide technical support in the actual conversion trials;
- o (Where needed) **Follow-up visits** to assist in the elimination of any subsequent emerging problems.
- o **Post-audits** to document complete and safe conversion to non-ODS technology (this will generally take place in combination with one of the previous mentioned visits).

It is anticipated that the initial use of international foam experts will gradually be replaced by activities of local experts.

The coordination of the entire program will rest jointly at the DENR and UNDP.

5. TECHNOLOGY

5.1 OVERVIEW AND SELECTION

There are numerous technologies to replace the use of CFCs in flexible foams by non-ODS or low-ODS options. It is referred to publications by UNEP and documentation available through UNDP for summaries of these technologies. Methylene chloride is one of the most cost effective technologies and generally applied where process, industrial hygienic and regulatory conditions allow.

5.2 IMPACT ON PRODUCTION PROCESS

The discontinuous ("Box-Foam") technology is the prevailing technology used at the small scale flexible foam manufacturers. The capital costs related to the introduction of methylene chloride are mainly related to formulation adjustments and the upgrade of ventilation to maintain acceptable workplace conditions.

The exception is when the use of insufficient stabilized polyols or the production of extreme low densities will cause scorch, indicating increased fire risk. Under such circumstances the use of methylene chloride can only be recommended in conjunction with an accelerated cooling system-- which in itself constitutes a simple addition to the existing equipment--or drastic formulation changes.

6. PROJECT COST

It is proposed to budget an average of USD 30,000 per plant for modifications and trials. This may not be enough in individual cases, related to very low densities. In such cases the company will generally have to gain as a low density is related to a relatively large amount of physical blowing agent. A contribution from the company to the trial costs will then be requested, which will limit the disbursed costs. The project does not allow the calculation of recurrent costs/benefits in advance as the required detailed information is not available without individual plant audits.

6.1 CAPITAL COST

BUDGET ITEM		SUB-TOTAL	TOTAL
o	Training programs (3)		
	o organization/logistics	USD 5,000	
	o travel/DSA attendants	USD 10,000	
	o training materials	USD 3,000	
	o national expert	USD 1,500	
	o international expert	USD 4,500	USD 24,000
o	Individual audit program		
	o national expert	USD 3,000	
	o international expert	USD 9,000	
	o international travel	USD 5,000	
	o local travel & expenses	USD 5,000	USD 22,000
o	Preparation action program		
	o local expert	USD 1,000	
	o international expert	USD 3,000	USD 4,000
o	Equipment, chemicals. 20 plants @	USD 30,000	USD 600,000
o	Implementation visits/post-audits		
	o national expert	USD 3,000	
	o international expert	USD 9,000	
	o international travel	USD 5,000	
	o local travel & expenses	USD 5,000	USD 22,000
o	Follow-up visits/post-audits		
	o national expert	USD 3,000	
	o international expert	USD 3,000	
	o Local travel & expenses	USD 2,000	USD 8,000
o	Contingency and rounding		USD 65,000
GRAND TOTAL			USD 745,000

6.2 UNIT ABATEMENT COST

a)	ODS Reduction Project Costs	USD 745,000
b)	Annual incremental Costs/Benefits	n.a.
c)	Project Useful Life	10 years
d)	ODS reduction/y	kg 35,000
f)	Capital Recovery Factor (10% discount)	0.16275

Unit Abatement Costs [(a(f) + b)/d]	USD/kg/y 3.49
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7. FINANCING PLAN

The requested grant for this project is

USD 750,000

8. PROJECT IMPLEMENTATION

8.1 SCHEDULE

Implementation schedule will start with MLF approval of the project and will end after monitoring has confirmed that at no company unsafe levels of methylene chloride can be detected.

TASK	TIME FOR COMPLETION					
	Q1	Q2	Q3	Q4	Q5	Q6
1. Preparation						
MLF Approval	x					
Training Programs (3)		x				
Individual Plants Audits		x				
Implementation Plan		x				
2. Implementation						
Implementation visits			x			
Follow-up Visits				x		
Safety Devices			x			
3. Post-Audits			x	xxx		

8.2 MANAGEMENT

UNDP will oversee the implementation of this project and provide technical assistance. DENR will administer the project and assume responsibility for all local arrangements.

8.3 PROCUREMENT

Procurement will be done by the recipients with support from the local and international experts.

9. PROJECT IMPACT

This project will eliminate the use of at least 35 tons of CFCs in the first year of implementation and ensure process safety in the use of methylene chloride as replacement technology. It is aimed to provide a cost effective alternative compared to the procurement of individual companies. The project employs commercially and environmentally acceptable technology.

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94-02-08/02

RESOURCE POOL

Consulting In: Environmental and
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TECHNICAL ASSISTANCE, BOX FOAMERS PHILIPPINES

SCOPE

The project is concerned with the replacement of CFC-11 in the manufacturing of flexible polyurethane foam.

RECOMMENDATION

The project is supported.

RELEVANCY AND ADEQUACY OF INFORMATION

The document provides adequate information, with the exception of the source of "local" experts. It is difficult to become "expert" in making foam in a short time. If the expert is a government employee, he is not likely to be invited to the factories.

TECHNICAL SOUNDNESS

The choice for methylene chloride is the easiest and most economical as long as the safety issues are addressed. With the latest vapor analyzers testing for safe levels in the workplace is easy.

LESSON FROM EXPERIENCE

The choice of the local expert will be critical to the success of the long term changeover. It will affect the Individual Plant Visits, the Follow-up Visits, and the Post-Audits.

ENVIRONMENTAL ISSUES

Methylene chloride is an environmentally acceptable substitute.

SAFETY ISSUES

Workplace safety is adequately addressed.

COST EFFECTIVENESS

The cost is typical of fairly low ODP elimination projects.

Jerry Pool
10/Feb/94

